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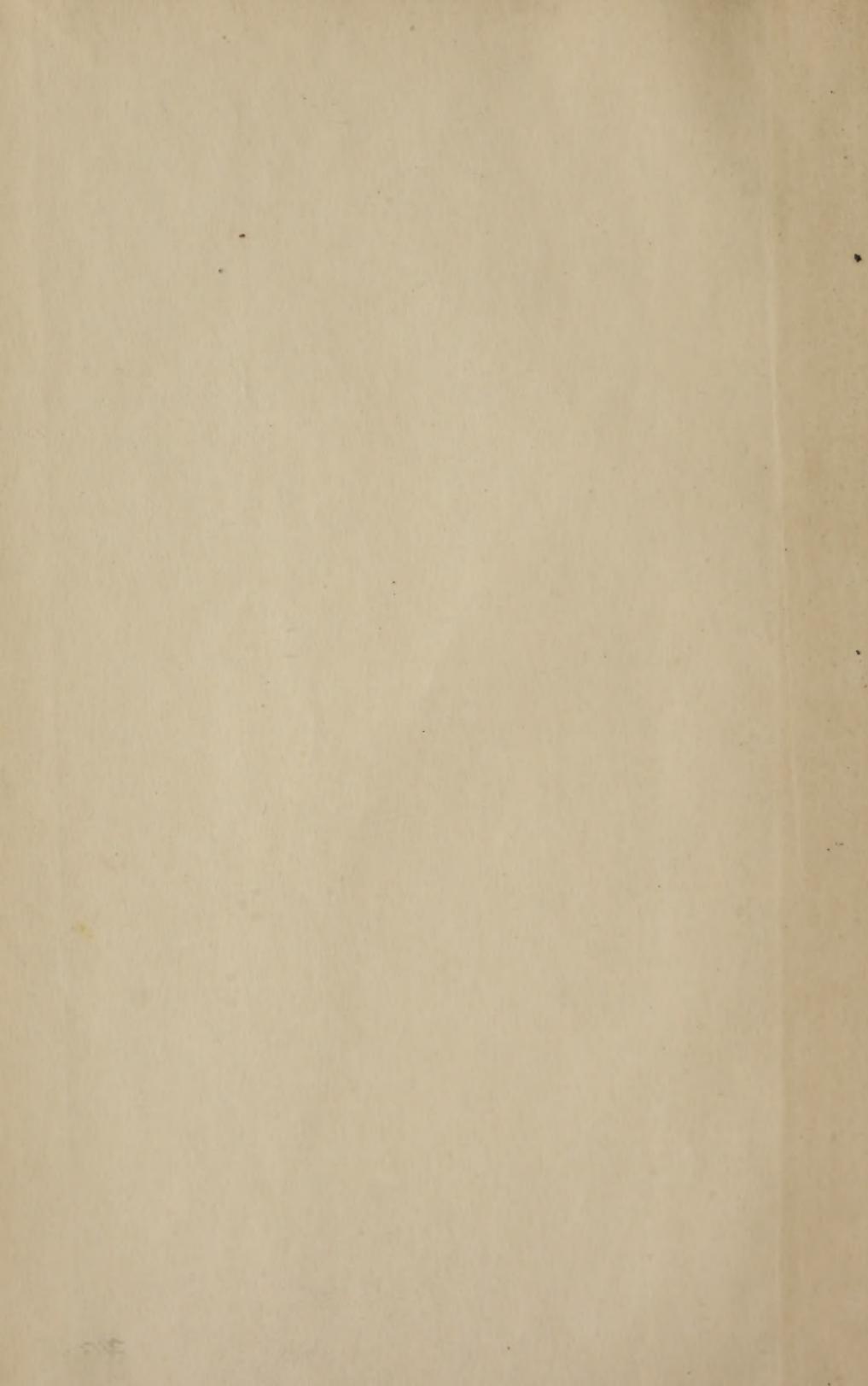


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THE  
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## CONTRIBUTIONS.

### A Plea for High-Grade Work.

BY C. N. JOHNSON, L.D.S., D.D.S., CHICAGO, ILL.

WE see so many articles appearing from time to time in our periodical literature, advocating the more extensive use of amalgam in preference to gold, that it would seem advisable to call attention to some of the fundamental principles underlying the characteristics of the two kinds of filling material, to the end that the selection of a material may be governed by a reasonable degree of intelligence. It goes without saying that gold, for various reasons, cannot be used in all cases, but when the question arises as to the intrinsic merits of the two materials, there is no longer any reasonable ground for controversy. Recent investigations into the amalgam question would seem to have settled that.

The limitations of amalgam relate principally to its instability when subjected to stress—as in mastication—to its liability to change form after crystallization, and above all to the lack of uniformity in results, even where the operator has paid the minutest attention to details in manipulation. Many of its defects as a filling material are not apparent to the naked eye—for instance, it may shrink sufficiently to allow of a leaky filling,

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the profession, urging the following argument to justify his extensive use of amalgam: "I can manipulate amalgam so much more rapidly than gold, that although I get less for a filling, I can make more money with amalgam on account of the extra number of fillings I may insert in a day."

I wish to express not only my condemnation of the mercenary and unprofessional spirit exhibited by such a remark, but also to say that I have little faith in his ability as a manipulator of gold if what he said was true. A man simply advertises his own incompetence when he makes such a statement. If he can manipulate gold at all well, he will make more money by filling teeth with gold, at regular gold fees, than he will with amalgam at regular amalgam fees. Much of the time consumed in filling teeth is occupied in the preparation of the cavity. When the cavity is prepared, the insertion of the material, whether amalgam or gold, is usually not a very lengthy operation, especially if the operator be expert in its manipulation. It requires as long—or at least it should—to prepare a cavity for amalgam as for gold. If a man makes a larger income from the use of amalgam than he could with gold, it is because of one of two things—either he cannot manipulate gold to advantage, or he does not take the requisite pains in the preparation of cavities for amalgam. Probably, in many instances, both of these things enter into the case. I fear that very few operators who use amalgam extensively, take as much care in preparing cavities as they should, and one of the main arguments against amalgam is that from the very nature of the material it influences most men toward a slip-shod method of operating. It is safe to assume that if one of our very best operators were confined to the exclusive use of amalgam for one year, he would not be so accomplished an operator at the end of that time as he was when he began using it.

On the other hand, the more an operator uses gold the more expert does he become in its manipulation, and in his command of instruments generally. It brings about a training of the muscles of the fingers and hand, which makes them more supple and responsive. As a clear illustration of what I mean, let the dentist be engaged in writing at his desk and in the midst of this let him be called to his chair to insert a large gold filling. When he returns to his desk he will find that his hand has a much better

command of the pen than before he performed the operation. The letters flow easily and without apparent effort, and he instantly realizes that his muscles have undergone a training which the manipulation of amalgam never would have brought about.

There is a refining influence in the use of gold, which will in time permeate a man's practice. He intuitively takes more pride in his work ; he keeps his hands cleaner, his instruments, napkins, operating case, and above all else he leaves his patient's mouth cleaner.

The argument is often advanced that people cannot always afford to pay the high fees necessary for gold work. This may be true in isolated cases, but the whole question of cost is largely one of education. The public in general can afford to pay for anything that they really need, and they will pay for it if they believe it to be essential to their welfare. The requirement is for the dentist to educate the people to the fact that they need good dentistry the same as they need the services of a reliable physician when they are sick. It is something which has to do with their bodily welfare, the same as any other organ or set of organs. Supposing a man found himself in danger of losing a finger ; would he hesitate about paying a good physician's fee, if by so doing he might save his finger ? People are not sufficiently interested in their teeth, and it is largely the fault of our profession that they are not.

They expend money enough for clothing in one year to keep their teeth in good condition for ten. "Yes," some one says, "but clothing is a necessity and people realize that, and spend money for it through force of obligation." I want to say that people did not always consider it a necessity, and there are countless numbers to-day who do not believe it necessary to wear clothing. What of the Indian of the Mojave desert ? Does he spend money for clothing ? It is simply a matter of education, and people to-day wear clothing as a concomitant of the advanced civilization which should consider in like manner the care of the teeth an equal necessity.

The best dentistry is none too good for the human family, and it should be the aim of every progressive practitioner to take a high stand in the class of work he does, and in the estimate he places upon it, to the end that the public may advance to a just appreciation of his services.

## Working of Steel.

BY C. R. BUTLER, M.D., D.D.S., CLEVELAND, OHIO.

(Continued from December number, page 561.)

ALL tool steel should be thoroughly annealed in closed retort, or annealing tubes, to prevent it from scaling.

Where large quantities are used, a specially constructed furnace is used in which these tubes are filled with steel, pulverized coke and charcoal, then placed in the furnace after sealing the end of the tube with an iron stopper and fire-clay. Subject the whole mass to a red heat for a short time, the tubes may then be removed and buried in slacked lime until cold before opening to remove the steel. For small dental instruments a piece of 2 inch iron gas pipe, about 18 inches long, with a screw cap to close up one end, makes a good annealing tube in which to seal up your steel, after cutting it the length for two instruments, a convenient length to handle in forging, if it be new stock.

The fire-box of the cook stove may be used to heat your sealed tube, the object of thus annealing your steel is to make it soft and secure normal relation of the ultimate particles, which had been disarranged in milling.

A fine quality of steel before annealing, if microscopically examined, will show about a hundred thousand crystals to the square inch, and some forty million when properly annealed.

The ordinary blacksmith buries his tool after it is forged, in the cinders on the hearth of the forge to cool before filing it to shape, (a crude way of annealing), his notion is that by so doing it makes it soft.

Old instruments for repointing should be carefully heated at the point end and stuck in a box of slacked lime to cool.

FUEL FOR THE FORGE.—I prefer charcoal and clean slack; and the steel should be forged whether square, octagon, or round stock, at a little above a dull red heat, and in drawing to a taper it should be first forged on the square, then carefully octagoned, or filed round from the square, for shank and pointing, and the forging should be done quickly, or with as few *heats* as possible. Great care is necessary not to *over-heat* at any stage of the process.

Forged blanks may be had from instrument makers by giving them a drawing or wooden pattern of special form, unless you desire to have the satisfaction of making an instrument from the original stock with your own hands.

There is no feature in manual exercise that will bring out such concordant power of hands and head, as the forging and filing to shape of metals, all of which is a most valuable acquisition for a dentist.

What would surgery and dentistry be without steel for the multiplicity of instruments that we must have?

It has become so indispensable in mechanism, that it is worthy of a place among the royal metals. Gold can be dispensed with in the construction of a fine watch, but steel never. The Corless engine and ponderous locomotive must have its quantum of steel to be complete; no other metal can be given equal flexibility with stability.

(To be continued.)

## A Bridge so Constructed that the Porcelain can be Replaced.

BY DR. A. L. DE VILLEISS, DECATUR, IND.

BACK the tooth with 28-gauge gold, pure gold is preferable, and allow the gold to extend from one to three lines above the pins, as the case may require, bring down to the cutting edge of the tooth, first grinding the tooth to the desired shape. I always use the teeth with the pins crosswise, not bending the pins. The tooth is put in place with base-plate wax. If you wish to use a bicuspid or molar you will back in the same way, then swage cusps to fit backing, allowing the cusps to extend a little over the porcelain. After the teeth are in place and properly articulated, you will remove the porcelain with a thin pointed instrument. In the holes you will place lead points, the same as used in pencils, (nineteen wire gauge) letting them extend out a little. Cover the backing with stove polish, with a hair brush. You are now ready to invest in the usual way bringing it well up over the cusps, if you have them in the bridge. Wash out the wax, work a little borax down between the backing and the cusps, by dropping the powder in and tapping the case with a little instrument,

then blow the surplus out. Solder in the usual way. The solder will flow around the carbon pins and as soon as cold you can dress, and remove the carbon pins with a small drill. Put your teeth in place and after they are all carefully adjusted, remove again, counter-sink the holes in back of bridge. Cement all of the teeth in place with good cement. You can pinch the ends of the pins together. Then place the bridge in plaster, leaving the pins exposed, after the plaster hardens, rivet. Remove from plaster and finish. You can make a very pretty finish on the part of the tooth exposed with "Crocker's Enamel Restorer."

## Two Cases of Diseased Maxillary Sinus.

BY W. H. TODD, D.D.S., COLUMBUS, O.

AMONG a number of cases sent to me by one of our leading surgeons, are two of which I wish to speak.

The first one, a gentleman, was directed to come to Columbus, to be treated for what he supposed might be a cancerous tumor. The surgeon sent him to me to make an examination of his mouth. I found a number of ordinary cavities to be filled, the right superior first molar gone, which, he said, had been extracted in February, about the time he began to suffer, and it was in July when I saw him. From the socket which had not healed up, as usual, there was an ugly looking spongy tumor or fungus growth which had grown down so that it hid from view the second molar and protruded into the mouth. In probing, I found that with very little difficulty I could go into the maxillary sinus, causing a discharge of pus. I began by dissecting this tumor and syringing with warm water containing a few drops of carbolic acid, until I had gotten rid of the growth, when I found the opening into the antrum as large around as a lead-pencil; the cause of all the trouble was then apparent. In extracting the tooth one root had been broken off and found its way into the antrum, where it remained until it was washed out.

In a week the gentleman returned home with the antrum trouble on the road to recovery, and the other teeth filled.

The second case, a lady, was advised to consult with me; in this case there was no swelling and the teeth were, apparently, in good condition.

She said she had suffered about four months and had lost from forty to fifty pounds in weight. All this time there was a dropping of pus into the pharynx from the nasal fossæ, which had been syringed and treated, but without success.

The last dental work that had been done was the right superior second molar, with a very nice looking amalgam filling, which, she said, had been put in without pain, a short time before her trouble began.

I took the filling out and found the decayed dentine had not been removed, and the pulp, still in the canal, in a decomposed condition. I extracted the tooth and opened up into the antrum and found it full of a dark, nauseating pus. I syringed out and treated, and at the end of ten days the case was dismissed as cured.

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### Necrosis following Chronic Abscess.

BY W. D. SNYDER, D.D.S., SIDNEY, O.

IN the latter part of December, 1892, a case of what was supposed to be chronic abscess of the superior incisors, was referred to me for examination and treatment.

Patient, healthy man of about middle age. Occupation, farmer.

Upon inquiry, I was given about the following history of the case: Some six or eight months previous, the centrals and laterals had been filled with gold. From some cause the teeth became very sore and ultimately abscessed.

The patient returned to his dentist for treatment, when the right central was extracted and others treated, but without success, so far as the getting rid of the abscess or flow of pus from the gums. This condition kept up during the summer and fall of 1892. When the patient presented himself to me, upon examination I found the following conditions: Labial aspect of that portion of gum extending from left central to right bicuspid, not swollen but very much thickened, of a deep red, almost purplish color, with pus oozing from two or more fistulous openings.

I at once diagnosed the case as containing dead bone, but supposed the disease had not extended farther than the alveoli,

but upon injecting permanganate solution, found it passed through the floor and into the nose.

Finding the right lateral very much involved and wishing to get free access to the seat of the disease, I extracted it and was thus enabled to force my washes through this channel to almost all parts of the diseased territory. For cleansing and correcting the offensive odor I thoroughly washed the diseased part with lukewarm water and peroxid of hydrogen; following this with permanganate solution of about 4 or 5 grains to  $\frac{1}{2}$  oz. of water.

As a stimulant and agent to assist in throwing off the sequestrum, I used the following wash: Aromatic sulphuric acid 3 ii., tr. capsicum gr. x, aqua 3 ii.

This treatment was kept up until pus almost ceased to flow, and the jagged points of bone could be perceptibly felt through the gums, when an incision was made and the sequestrum removed, after which antiseptic washes were employed until the wound had quite healed and all signs of inflammation had disappeared.

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### Dentifrices and Tooth Cleansing.

BY W. H. FOWLER, D.D.S., PAINESVILLE, OHIO.

PULVERIZED orris root and prepared chalk, is the body of most all dentifrices on the market. What are the medicinal qualities of orris root? From U. S. Dispensatory—a cathartic when given in large doses and an emetic—its value chiefly is agreeable odor and use to conceal offensive breath.

It does not seem reasonable to suppose that the use of any of the insoluble vegetable powders, such as orris root, is advisable. They are very slow in decay and insoluble. Small particles may remain under the gums and cause germ development. The objection to prepared chalk, is also its insolubility and the evil effects which may arise from its lodgment in the pockets and under the gums. I cannot conceive of any one prescription that is specific and the proper remedy to prescribe in all cases.

My idea of a proper dentifrice to be used by the masses, would be a stimulant, ant acid and antiseptic.

Now, what are the medicinal qualities of salt so emphatically condemned by some dentists?

*Table Salt.*—It is a stimulant. It is a styptic used often to stop hemorrhage. It is used to reduce inflammation in bruises and sprains. A valuable remedy as a tonic, an excitant in depraved condition of the system. The use of common salt in domestic economy as an *antiseptic*, is well known. What better medicinal qualities can you find in any one harmless remedy when prescribed in the right place. (I would not recommend it in scurvy, or in any community whose chief diet was salt, june, sow-belly and hard-tack.) In cases where communities live principally upon fresh meats, vegetables and food made from cereals, fruits and good things generally, for gums congested or inflamed, and for teeth covered with slimy deposit and acid stains from want of proper care, I would prescribe fine salt and plenty of elbow muscle and wrist action to be used at night, before retiring; for at least a week, wetting the brush and taking all the salt that will stick to it and as much more as you care to, rolling the brush up and down as well as crosswise, until the salt is dissolved ; then rinse with water. After its use a week or more return for further treatment if needed.

The particles of salt act the same as shot in cleaning vials.

I am not ashamed of this prescription, for I have seen its value as a dentifrice for the last thirty-eight years. The dentist is not often called upon to prescribe for or even counseled about the care of the teeth in sickness, and if he offers a suggestion of any mouthwash to overcome the evil effects of the powerful drugs or acids being administered, he is sneered at or called a crank by the M. D.

The remedies in most common use that I will speak about are muriatic, sulphuric and nitric acids—these largely diluted soon effect the teeth ; sulphuric and nitric ethers are similar in their affects ; also, spirits of niter. These are common diffusible stimulants, used in sickness. I might name many other remedies in use, but this is enough. What observing dentist has not seen the injurious effects of the medicines upon the teeth and gums, and also some of their most careful and thoroughly made plugs after one of his patients has been through a course of treatment by one of these careless M. D.'s. (I won't say ignorant.) I often hear of eminent specialists being called to the chair to lecture to the medical students in the last year of their studies before they receive their permit to practice, but never heard of a D. D. S.

being called. Why not? I think it is quite as important to prevent the destruction of the oral organs from the injurious effects of their powerful drugs, as it is to make a cure of some other bodily ailment. Don't you think if some of our best teachers could get a hearing before the medical students and impress upon their minds the importance of this subject of prescribing some mouthwash to their patients and counteract the effects of medicines on the teeth and gums, it would be well?

There are also other subjects belonging to our profession that could be taught them to their advantage as well as to that of ourselves and patients.

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### Our Society.—Its Present and Future Welfare.\*

BY HENRY BARNES, CLEVELAND, O.

AMONG the many subjects which might properly be presented for consideration by this body, the one which we present to day would seem to demand our serious thought and deliberation. With few words and no attempt at originality, we present the following:

In Polk's latest *Dental Register of the United States*, we find that Ohio is credited with 1,426 dentists, allowing for possible miscalculation there are probably 1,500 in round numbers. Enrolled as active members of our State Society there are 150 dentists.

This statement must impress you as being out of proportion and suggests the following questions:

Why is such a state of affairs possible?

How may it be improved?

As to the first question, we will not attempt an answer, for the reasons might be as various as the number of persons here present. Let us proceed to a consideration of the second.

In order to focus discussion we merely suggest a plan, for others may be proposed which may prove to be more practical, more applicable and more successful in operation. Let the different local societies throughout the State become interested in the

State Society to the extent that they be permitted to send delegates to the State Society, after the plan, modified to our needs, of the American Dental Association. You may in this way interest young men who will take pride in the State Society through the interest begotten in their local societies.

The hope of the future is in our young men, many of them are worthy and well qualified. As proof of this statement we ask your perusal of the program for this session.

In the past we have talked much, but little or nothing has resulted therefrom. Is it not time to "be up and doing?"

By reason of our present plan of work in the matter of program, the Executive Committee is put to much unnecessary labor and trouble. We suggest that the election of officers be held early in the session, thus giving the incoming president ample time to appoint committees, and to the Executive Committee time to see the members and procure a promise to write papers, before the close of the session.

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### Teeth Extracted Without Pain.\*

BY W. I. JONES, D.D.S., NELSONVILLE, OHIO.

If the statements of the people are credible there is not another operation in surgery, besides the extraction of a tooth, that they so much dread. The surgeon's table is not approached with a greater apprehension than is the dentist's chair, and this fear is real. The wonderful tales which are told about this operation are not altogether legendary. The pain is the genuine old blown-in-the-bottle kind, and none other is reliable, and the dentist who, in these latter days, depends for his success upon his sweetness of manners and the assurance that it is only a trifle and will be over in a second, must be content to listen to the fearful shrieks and groans that are sure to accompany the old heroic method of the extraction of a tooth.

Now, it is not the purpose of this paper to discuss the indications which point to this operation but to consider ways by which a tooth may be extracted successfully and satisfactorily

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\*Read at Ohio State Dental Society, December, 1896.

without pain ; this is a duty the dentist owes to human happiness. It should no longer be possible for us to locate dental offices by sound.

Chloroform, ether, nitrous oxide have been in use many years and with them teeth may be extracted without pain. Their good points are many but are outnumbered by those of any local anesthetic which will produce even a partial anesthesia of the organs to be operated upon. The extraction of teeth, during a state of general anesthesia, requires special qualifications on the part of the dentist. He must be skillful and possess a steady nerve and a clear head. This is especially true of nitrous oxide owing to the transitory effect of this agent. Many operators, where lancing is necessary, lance the gums before administering the gas and continue their operations after the patient begins to recover. The very purpose for which the anesthetic was given seems to be forgotten in their anxiety to get out the teeth. They save but little pain : such an operation is not a successful one, and certainly cannot be very satisfactory to the patient. If you are going to administer gas, give until your patient becomes unconscious and cease operations when he begins to recover. Chloroform and ether are sometimes administered until the patient has reached a state of semi-unconsciousness, or hardly that far, a condition some surgeons describe as "ether glow." To be successful by this method the patient must be given to clearly understand that he will have a knowledge of what's going on about him but that he will suffer no pain. Of the local anesthetics cocaine is at once the most powerful and reliable and none bears a greater burden of calumny, but in the hands of the careful practitioner, it will prove effective and satisfactory.

The following is a formula we use and pronounce good :

Cocain, - - - - - gr. x.

Listerine, - - - - - ʒ ss.

Agua Dest - - - - - ʒ ii.

This combination has the advantage of being both anesthetic and antiseptic and will not deteriorate with age. It makes a little less than a one and a half per cent. solution. In 15 m. of this solution, which will be found sufficient for the extraction of a tooth, there is but a fraction over a fifth of a grain and this amount is, with rare exceptions non-toxic. We have used cocaine for seven years. Within the past two years we have injected

cocain hypodermically into more than 2,000 persons. Have used it in numerous combinations, various percentages, and upon "all sorts and conditions of men." We have had some peculiar experiences, all of them interesting and instructive. Very rarely will the careful use of cocaine cause any untoward result, for ordinarily, it is quickly eliminated. Sometimes it will stimulate, and a sense of well-being is produced ; at other times the injection is followed by a feeling of oppression which may be quickly relieved by the inhalation of ammonia or ether. After an overdose the pulse becomes weak and rapid, breathing is labored and shallow, a cold perspiration breaks out, and the skin is clammy. These symptoms are at times accompanied by clonic convulsions, and in a case of this kind, nothing should be done that will excite the patient. He should be placed in a recumbent position and stimulants administered—arom. spts. of ammonia being one of the most reliable cardiac stimulants. Administer by the mouth in 15 to 20 m. doses, diluted in water or injected hypodermatically. Inhaled it stimulates the trifacial nerve and increases blood tension by reflex action upon the vaso-motor centre and prevents syncope. To relieve the nervous symptoms  $\frac{1}{2}$  gr. doses of morphine may be given by the mouth, or, if the patient is unable to swallow, inject hypodermically. Great care should at all times be used in the administration of anesthetics ; no less so with a local anesthetic than with one of a general effect. We have given cocaine when the patient was known to be affected with valvular disease of the heart, believing the heroic method for the extraction of a tooth in a case of this kind more liable to do harm than would cocaine, and we have administered large doses to persons upon whom at first minute doses have had apparently toxic effects. The eyes would become dull, countenance pale, skin clammy, which was quickly relieved by stimulants. More cocaine was given, and as the operation proceeded, the patient grew stronger. Idiosyncrasy, no doubt, is the only explanation for many peculiar cases. By the injection of pure water I have caused what was apparently cocaine poison. If cocaine had been used it would have been condemned for what was only a manifestation of the peculiar temperament of the patient.

Eighteen months ago William K. came to our office to have a tooth extracted. Cocaine was injected and almost immediately we found it necessary to administer stimulants in large quantities.

A year later he returned to have another extracted and requested us not to use "that stuff," thinking that it had made him sick the last time. We complied and turned to get an instrument. This opened the show and there followed every indication of cocaine poisoning. If an hysterical woman should come to your office, accompanied by a hen-pecked husband and you should have a scene, do not be in a hurry to attribute it to cocaine in every case. Study the temperament of your patient and act accordingly.

#### DISCUSSION.

DR. W. H. TODD: At the Tri-State meeting, a year ago, Dr. Hoff read an interesting paper bearing on this subject in which he gave some valuable formulæ. Parke, Davis & Co., of Detroit, have taken the formula for a local anesthetic and incorporated the ingredients into tablet form. I have been using these with great satisfaction. If you dissolve one tablet in twenty-five drops of distilled water, and add one or two drops of listerine, you have a two per cent solution. The bottle containing the tablets I found to hold just fifty drops, so by filling the bottle half full of water I know that it is just the amount to make a two per cent solution when one tablet was dissolved in it. In this way you have a fresh solution, which is always most desirable.

DR. J. R. CALLAHAN: In this excellent paper the writer failed to speak of the method advocated by Dr. Schleich. It seems to me that for general use, as an anesthetic, that this method is about the best. I would like to hear from Dr. Heise.

DR. O. N. HEISE: I have had good results from the use of this method mentioned by Dr. Callahan. I take about two grains of cocaine and dissolve it in four ounces of water. The anesthesia obtained, however, is not due so much to the action of the cocaine as to the edema in the parts, caused by injecting the liquid into the superficial tissue. I have always had good results where the tissues were not too tense. Lately I have been using eucain in about ten per cent solution, injecting from five to twenty drops. It is far superior to cocaine, the anesthesia being more permanent and the drug less toxic in its action. You can inject almost ten grains into a rabbit before death ensues. For ordinary operations about the mouth, such as pyorrhea alveolaris, etc., I prefer the Schleich method, as cocaine and eucain have a retarding effect on the healing of the tissues.

DR. OTTO ARNOLD: I have used eucain and prefer it to cocaine. It seems to be free from toxic effects. Where firmly imbedded teeth are to be extracted, however, I believe that there is nothing equal to nitrous oxide gas, when handled with care by an operator who has a good knowledge of the action of this gas. I believe that statistics will show more deaths from the use of cocaine than from the use of nitrous oxid.

DR. W. B. SNYDER: There is nothing that I would like to be more proficient in than tooth extraction, but I never do extract only where it is positively necessary. When I make the injection I can tell very accurately whether the extraction will be painless. There is a difference in the appearance of the tissues that a trained eye will detect. When the tissues whiten thoroughly you may expect satisfactory results. A solution that has given me great satisfaction is one of my own composed of :

B      5 grains cocaine,  
1-10 grain atropia,  
10 drops carbolic acid,  
1 ounce distilled water.

The manner of handling the needle has much to do with the success or failure of the operation.

DR. L. E. CUSTER: We have cases of cocaine poisoning where the cause is attributed to certain idiosyncracies of the patient, for there seems to be no other explanation for the cause, yet, I believe that in many such cases the real cause is injecting the cocaine solution directly into a vein instead of into the arterioles. It is possible to inject the entire contents of a syringe into a vein and on account of this you would get rapid poisonous effects by the cocaine being carried directly to the heart and lungs.

DR. G. H. WILSON: The thought expressed by the last speaker is a valuable one. In my early experience I had the same misfortune when extracting an inferior third molar tooth. I realized at once that the solution had entered a vein but on account of having had but little experience, I thought but little of it until the patient had been unconscious for nearly half an hour, then I realized the danger. I have specimens of necrosed bone that show the results of careless injection of cocaine. It is a question whether there is not some other and safer method of using cocaine successfully, than by injection. For instance, using it cataphorically.

DR. W. H. TODD: I have used cocaine cataphorically, applying five to ten volts, for tooth extraction and it has been successful. I have a clamp with two rubber cups attached and into these cups I place a piece of cotton saturated with a two per cent. solution of cocaine, then apply to either side of the tooth and use the electrical current for ten minutes.

DR. L. E. CUSTER: Have you seen any toxic effects from the cocaine when used in this manner?

DR. TODD: I have seen no toxic symptoms so far.

DR. BARNES: Has there been any sluffing?

DR. TODD: No.

DR. L. L. BARBER: I have had better success with eucain than with cocaine. You can use it more freely for it is not so toxic. As yet I have seen no bad effects from its use. When cocaine is used cataphorically the amount carried into the system is so small that it seems almost impossible to get toxic effects.

DR. WILSON: What is your idea of using the stronger per cent. solutions?

DR. BARBER: I have not used strong solutions on the soft tissues, but men have told me that they have used 75 per cent. solutions and without toxic effects.

DR. C. R. BUTLER: I am unable to see the consistency or necessity of using these substances, eucain and cocaine, knowing, as we do, that there are certain temperaments, or idiosyncrasies, of some patients where small per cents of carbolic acid, cocaine, eucain, etc., are poisonous. In the use of any of these poisons what is the effect on the system? The system must certainly have to get rid of them at some expense, and are we warranted in injecting such things when it is not absolutely necessary? It is well known that this is the age of anesthetics. Why? Not because patients have demanded anesthetics, but because some one has wanted to show off what he can do with such wonderful things as anesthetics. I have used almost everything brought before the profession in the way of anesthetics, and now simply because a patient has the headache, or something of the sort, would it be policy to inject morphine and prolong the abnormal condition of the system simply to get rid of the headache itself? If used intelligently ether or chloroform are superior to the local anesthetics. With nitrous oxid you get the effects quickly and the patient recovers

rapidly. I do not apologize for the use of these things for I use them whenever I think best to do so. I am not theorizing now, but know what I am talking about, for I used these anesthetics for years in general surgery as well as in dentistry. I do not think that dentists show good judgment when they cater to the demands of patients. The paper was a good one because it sets us to thinking. It simply speaks of the use of these anesthetics but does not insist upon their use and say that they are preferable to all others. When you say there is no danger of toxic effects you are saying something that you do not know. We cannot always see these things, and because they are not apparent to us at once is no sign that they do not exist. There may have been harm done that will not manifest itself for some time after the operation. If you must use an anesthetic, use one that is safe. Use those that give least disturbance to the general system.

DR. C. M. WRIGHT: About a month ago I was reading in a medical journal that there was no such thing as a purely local disease, that even though it had every appearance of being confined to one locality, yet it did affect the general system more or less. I am inclined to believe that that statement is correct and that the same thing happens when we use so called local anesthetics. We do get a systemic effect to a certain extent, and it is more like applying locally a general remedy.

DR. A. O. ROSS: There are certain rules one should observe in making hypodermic injections: avoid bony prominences, and large veins. In injecting for tooth extraction we are apt to injure the alveolar process or loosen the periodontal membrane and get serious local trouble. I think that the sooner hypodermic injections are stopped, the sooner we will get rid of a curse, for I have seen many serious consequences result from them.

DR. W. D. SNYDER: Probably bad results are most often due to carelessly kept hypodermic needles. If I were going to a dentist to have a tooth extracted for myself, I think I should take a new needle along with me for the dentist to use. It is not necessary to penetrate the alveolar process, in making the injection, or to puncture under the periodontal membrane.

DR. H. A. SMITH: I think Dr. Snyder makes a good point when he says that we do not sterilize our needles, but is there not danger of getting infection from not sterilizing the tissues in which we place the needle even though the needle has been ster-

ilized? Dentists as a class are not sufficiently trained in antisep-  
tic surgery. Dr. Custer's point ought to set us thinking, and  
brings up the question if a superficial injection is not better than  
a deep one.

DR. BILLOW: I would like to ask these questions,—What is  
the source of pain in extraction, and how does hypodermic injec-  
tion reach the source of the trouble?

DR. W. I. JONES: When a person comes to us to have teeth  
extracted, if we have to extract, we should use some means to  
relieve the consequent pain. It is a duty that we owe to patients.  
I do not place the needle close around the neck of the tooth, but  
in the deeper tissues. Regarding the questions I would say that  
cocain acts by paralyzing the ends of the sensory nerves.

### The Use of Antiseptics and Disinfectants.\*

BY H. B. BARTILSON, D.D.S., COLUMBUS, OHIO.

THIS is a subject that has been gone over so often that to  
some it will lack interest. It is, however, one to which we as  
dentists pay too little attention. Dentistry to-day reaches so far  
into surgery that we should pay the same heed as the general  
surgeons. Let us ask ourselves the question, do we? How often  
are the forceps, broach, and excavator simply wiped and laid  
away for the next operation? Is this just to our patients, know-  
ing as we do, that syphilis, tuberculosis, and many of the less  
loathsome diseases that are found from the hovel to the mansion,  
can and have been contracted from unclean instruments? One  
case should hound us the rest of our lives. The first principle of  
antiseptics is perfect cleanliness, and I know of no better means  
to obtain this, than sterilization of our instruments. Perhaps, the  
best method is boiling. The busy man will say it takes too much  
time. Let me tell you your patient is willing to pay for the few  
minutes consumed, as in ten minutes you can sterilize each and  
every instrument used in the previous operation. Now, with  
clean instruments, and I want to say clean hands, as I have seen  
dentists go from one patient to another without washing his

\*Read before the Ohio State Dental Society, Columbus, December, 1896.

hands, we apply our dam fresh from the sterilizer and our work of antisepsis is more than half accomplished.

It is not my purpose to eulogize or cry down any of the long lists we have to choose from, as each should use the one which gives the best result in his hands, but I should like to ask the question, why use carbolic acid, creosote and iodoform, with their disagreeable odor and taste, when peroxid, sulphuric acid, biclorid of mercury, and a host of others that are almost odorless will do the same or better work. Suppose we take the case of a pulpless tooth, our dam is in place, we will wash all the teeth enclosed with peroxid, follow with biclorid, then open the pulp chamber and with a small broach, and I use a small one that I may not force anything through the foramen, we slowly work our acid and peroxid to the end of the root, follow this with biclorid and thoroughly dry them. With clean instruments, and if they are not we undo our previous work and plant the seeds of future trouble, fill with any suitable material. To some this may seem a tedious process, but to them I will say, since I have adopted this method I have not lost two per cent of teeth so filled, many of them have been immediate fillings, and I believe clean instruments have added largely to this result.

It is said physicians never allude to the funeral of their own patients, so perhaps I have not been forced to face my mistakes. Does our work stop here or should we not try to prevent decay rather than lend ourselves to the repair of it and instruct our patients how best to cleanse their teeth, recommend some anti-septic wash that will keep their mouth in an aseptic condition, restrict matters as to their diet during pregnancy, and what will be best for children while their teeth are calcifying.

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### Smooth-Pointed Pluggers.\*

BY C. G. MYERS, D.D.S., CLEVELAND, OHIO.

ABOUT five years ago I discarded serrated pluggers and began using those with smooth points. The idea was original with me as I had never heard of them being used. Being a constant reader of most of the leading dental journals, I was surprised to

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\* Read at Ohio State Dental Society, Columbus, December, 1896.

find nothing in them on this subject. I have also quite a large acquaintance among dentists in almost all parts of this country and with all my questioning I have yet to find the first who is using smooth-pointed pluggers. It is only within the past month that I have heard that a number of years ago they were used and that articles concerning them appeared in the dental journals. My first object in presenting this paper was that it was something new, but now it is presented with the idea of finding out wherein lies the fault in these instruments which I have apparently used with such great success. When I was in college, ten years ago, the pluggers we were taught to use had deep serrations and some of the leading cohesive foil operators advocated them. In late years the tendency seems to be toward shallow serrations. Dr. Ottolengui recommends the point of a broken instrument, where we only have the roughness of the grain of the steel. The advantages I claim for the smooth over the serrated pluggers are these: Closer adaptation to the walls and margins of the cavity; greater density of filling, which is apparent in finishing or polishing, and the greater ease with which we can work the gold in narrow or contracted spaces. For the benefit of those who have not used the smooth points, I would say I use those having a broad point and a contracted shank, or those of the club foot variety. The points are bright and tempered very hard, and are kept bright by rubbing from time to time on a piece of sole leather. They cannot be used with hand-pressure. The question is often asked me if these pluggers are applicable to contour as well as flush fillings. They certainly are, in fact I know of no limit to the contour I would attempt with them. Cohesive gold has the property of being welded one piece with another, and it makes no difference whether we use deep or shallow serrations, or whether we use clean burnished points. In fact I claim that the serrations are a disadvantage rather than an advantage.

#### DISCUSSION.

DR. W. H. TODD: The use of smooth-pointed pluggers is not new. Years ago Dr. Blount advocated their use and after that we heard of them through Herbst and others, and I well remember how Dr. Baughman, of this city, used them years ago. If I could use these smooth-pointed instruments successfully myself I should do so, for I think that we get a more perfect filling than by using

serrated pluggers, especially those with deep serrations. I like the pluggers that are made to go with the Bonwill mallet. The ones I particularly refer to are right and left. These instruments are made by the S. S. White Co.

DR. J. S. CONVERSE: I have had no personal experience with smooth-pointed pluggers, and can therefore not say anything on the subject from a practical standpoint. I do know, however, that their origin is not recent. I have a set of smooth instruments that were made by Dr. Blount more than 21 years ago. When the Herbst method of using rotary burnishers was introduced, it found favor with a few, but never came into popularity. It is not every dentist who can manipulate gold successfully with these smooth points, but those who can do so will have a filling well condensed.

DR. J. R. CALLAHAN: Some years ago some one brought out the ivory-pointed pluggers, and then, a few years ago, Dr. Rich, of Boston, invented a set of smooth pointed hand pluggers. I use smooth points with a burnishing motion, which gives me the best results. I use No. 60 gold, and it is annealed on an electric annealer. This is absolutely necessary in order to work it most successfully with smooth points. The smooth point has its place and it requires an operator to find that place.

DR. O. N. HEISE: I have used smooth-pointed pluggers for many years. I got the idea from Dr. Bonwill, some fourteen years ago. With the smooth points I get an adaptation that I cannot get in any other way.

DR. HENRY BARNES: Dr. Stephan used smooth-pointed pluggers over twenty years ago. A broken instrument used to be used for a plunger; then came the serrated points, made by passing the instrument over a bastard-cut file; next came the Palmer forms of pluggers, and the Butler. I have never used smooth points. That is, I was never able to use them successfully.

DR. A. E. McCONKEY: The late Mr. Runyan always used smooth-pointed pluggers. I use smooth points as much as the serrated and believe that I get just as good if not better results from their use than with serrated pluggers.

DR. J. TAFT: Dr. Blount was the first to introduce smooth-pointed pluggers, and that was along in the 70's. In 1881 I saw him make operations with them in Europe. He became very expert with them. His method of filling was quite unique. The

cavity was lined first and then filled as a simple cavity. Dr. Chance, of Portland, Ore., used smooth-pointed pluggers about the same time as Dr. Blount. The Herbst rotary points never came into general use. Probably better adaptation to the cavity walls can be secured with smooth points than with serrated pluggers, except possibly the very finely serrated points. This was nicely illustrated with the Herbst method. Teeth filled with the rotary points, and others filled with serrated points, were broken open and the Herbst filling was found to be more perfectly adapted to the cavity walls, and more dense than fillings made with the serrated pluggers. I think that these smooth points have their place in dentistry and should be used more than they are.

### Making an Artificial Denture.\*

BY R. A. FOLEY, D.D.S., PITTSBURGH, PA.

WHEN we make a plate, we unite a series of operations that we know are correct, and that we know will do certain things precisely, and that in a general manner admit of no deviation. We know of different materials with which we can take an impression; that certain ones are better under certain conditions than others. We can truly say we know, and this knowledge is employed alike by all. From our impression, we produce our model or cast, and we know exactly why we do this, and so continue on until we reach a definite result. Of course, we understand that there are no two practitioners who make the same plate in all details, but certain points lie as a substratum, and these we all must employ alike, and in so much the knowledge is scientific. Few operations in the practice of dentistry equal in success that of a well adjusted set of teeth, no matter of what it is composed, and to gain this important object in a perfect fitting denture, we have the impression, the bite, the proper arrangement of the teeth and the curing or vulcanizing of the same. In taking an impression of the mouth, it has always been a custom with me to use an impression tray that will fit the jaw as neatly

\* Read before the Odontological Society of Western Penn., at New Castle, Sept., 1896.

as possible, using wax to build up on edge of tray to force plaster well up on heels and front portion of jaw. If the arch is very deep, I place a small piece of wax on palatinal portion of tray, always taking care to avoid any pressure on any one point. Now, taking plaster, mixed to the proper thickness, I proceed to apply it to the mouth, being careful to get an even pressure over all the surface. In first inserting the tray loaded with plaster, I make it a point to start the pressure from the rear of palate and bring it gently forward and upward at the same time, until I have the tray firmly pressed to the jaw, then pressing gently on lips and side of face, causing the plaster to squeeze in and adapt itself to all undercuts that are present. In using this method, I get an impression that is very hard to remove from the mouth. In all cases I am compelled to take hold of the upper lip and stretch it before the impression material will come way. Now we have an impression as perfect as any practitioner needs. The heels stand out prominent and the front portion of ridge is plain, showing muscular attachment. Our next important part of this operation, is to get a smooth and clearly defined model from this. I find it a good rule never to let an impression stand for any length of time, always immediately coating it with a thin solution of silicate of soda, and right here I will say that it is in my opinion that we lose the benefit of a good impression by the careless manner in which a great many dentists varnish their impressions, using preparations that are entirely too thick. Another point, I think I gain by pouring my model right away. The impression being damp, the plaster flows more readily into all depressions, and I am not bothered with air bubbles. It has always been the case where I have carelessly left impression lying for any length of time before pouring model, that I did not get the same satisfactory results when I fitted the denture to the mouth. How to account for this I do not know, unless it is due to the drying out or shrinking of the impression. It has always been a strict rule with me, after having taken an impression, to insist on the patient coming for a return engagement as soon after the operation as possible, never later than a week. I impress the fact on their minds that teeth will not fit if delayed longer than said period. My reason for a rule of this kind is where a set of teeth has been made and left to lie in the dental cabinet for from two to four weeks, or perhaps longer, you will find that a change

has taken place in the tissue of the mouth, causing dissatisfaction from the start, at least that has been my experience, and, from a business point of view, it is a good rule to get them in the mouth as soon as possible, thus avoiding a lot of dead stock and with no complaints coming. Now as to the preparation of the model. It has always been a puzzler to me why some dentists cut and scrape a model after it has been removed from a perfect impression. Why it is done? Suppose we take a model that has been prepared in a crude manner, here and there we find small pieces gouged out where the point of a knife has come in contact with it when separating, or it has been poured by the dentist in a careless manner. It is rough and full of air holes. What do we find when the patient has worn a set of teeth, prepared from such a model? After two or three days they come back with a mouth that looks as though it had come in contact with a meat ax, and suffering such agony that it is impossible to touch their mouth, let alone their wearing such a set of teeth. I have followed this advice of preparing a model to my sorrow; it always meant another set of teeth made over, if it was a case of hard or soft mouth.

Now we will proceed with another act of importance. The taking of the bite. We, as dental practitioners, have our own hobbies; some are good and some are not. One method we can't fail to let pass without expressing our opinion, and that is the man who takes a large lump of wax, stuffs it in the patient's mouth and says, "Close your jaws; - using no care whatever as to median line, length of lip, or general expression. He leaves it all to the lump of wax, that is his limit. He has no eye for the artistic uses, no judgment, and yet he has a sign out on his door in big letters, "Dentist." What is the consequence? It is a set of teeth, as far as the word goes, but then when we look at the hundreds of such sets of teeth grinning at us every day, we wonder where is our much talked of scientific dentistry. I can't see for the life of me, why a man calling himself a dentist, with any conscience, can turn out such work. The patient is not to blame. We are supposed to be doctors of dental science, and they come to us putting trust in our ability as such. Gentlemen, is it any wonder that a large percentage of people come to us with suspicion? Only a few days ago, I had a lady call on me for a set of teeth; she was perfectly satisfied as to the price, but she

wanted to be assured as to what she was going to get. She gave me strict instructions that her next door neighbor had a set of false teeth, and she thought if the teeth she was about to get looked like her neighbor's, she would give up the idea of wearing teeth altogether. This is a sample of what great damage a tooth carpenter can cause, but the time is coming, thanks to the up to date method of education that is now in use in our public schools and colleges, the dental drone will have to depart from the rut into which he has fallen, to keep his head above the flood. Now, gentlemen, I am not speaking as an expert by any means, but I have been employing a method of taking a bite and find it to give me the best satisfaction in the form of denture. I take both bite and impression at the same sitting. After taking impression, I take a flat-bottom impression tray, fill it with warm wax, gently press up on the jaw, cool with a small napkin saturated with ice-cold water; this gives me a base plate in wax; remove from cup, trim up ridge, insert in mouth, get length of lip, remove the extra length and re-insert. Now take knife and mark median line and trim a little at a time until I get the expression. Now I have patient close gently on wax, just enough to show edges of teeth. Then I put the patient through a series of movements until I am assured that bite is right, then taking a small thin roll of wax, I press this on my wax base, have patient close on plate and I get the occluding surface of teeth. I articulate the same, mark median line, and lock articulator. Now we are ready for that dread of all dentists, the selection of the proper shaped teeth for model. Time and time again have I heard those expressions of blue smoke and brimstone, in my twelve years' experience behind the counter of a dental depot. I wondered then, but since I joined the order of "Tooth Picks" it has come to me more than once. After a great amount of mental strain, we at last succeed in finding a set that will suit the case. Then comes the tug-of-war to grind them and set up, to get all these points worked out that they may look like a set of teeth. How many of us in the rush and worry of a dental practice, pay attention to all these details. A great many dentists to day, I am sorry to say, pay more attention to the price that they are about to receive than they do to practical and scientific formation of a denture. In grinding up a set of teeth, I have nothing new to offer; the points I always grind to meet square. I don't approve of this

idea of grinding blocks V-shaped. This method is, I think, the cause of all of our cracked and splintered joints, as all rubber shrinks more or less when cooling. The blocks are bound to crack when this contraction takes place. In avoiding dark joints after my case is ready for investment, I immerse case in clear water, this leaves the joints wet. Now, taking plaster mixed thin, I flow into them and invest. After case has been boiled out, flow thin cement in the rear portion of joints. I have no trouble with dark joints in teeth where this method is carefully done. In packing the case with rubber, I take two long thin strips and pack well around pins, then having the balance of my rubber cut in V-shape pieces, about one inch in size, I can lay them in and avoid the large amount of extra surplus that is so common in vulcanite cases. In the vulcanizing I still stand by the regular method half-hour to raise to 320° and let stand at that one hour. Now, when finishing a plate after it is vulcanized, I prefer to let rim of plate run well up on ridge, of course making an allowance for the frenum and side muscle attachments. Where this is done in a rounded off and neat finish, you will find such a plate sticks from the start. In following all methods which I have described in this paper, I have the most gratifying success.

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## ALL SORTS.

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### Restoring Tarnished Gold.

According to the *Jewellers' Circular*, the following mixture is an excellent one for restoring gold which has become tarnished:—

Sodium Bicarbonate	- - - - -	20 oz.
Chlorinated Lime	- - - - -	1 oz.
Common Salt	- - - - -	1 oz.
Water	- - - - -	16 oz.

Mix well and apply with a soft brush. A very small quantity of the solution is sufficient for effecting the desired purpose, and it may be used either cold or lukewarm. Plain articles may be brightened equal to new by putting a spot or two of the liquid upon them from the stopper of the bottle and lightly brushing over the surface with fine tissue paper until sufficiently dried off to accomplish the object intended.—*Pharmaceutical Journal*.

### Gingivitis and its Relation to Crown Work.

It is certainly a lamentable fact to note the surprisingly small percentage of roots carrying crowns that are entirely devoid of any evidence of periosteal inflammation, or that are surrounded by tissue presenting a normal or healthy appearance, as compared with the very great percentage that invariably manifest more or less marked degrees of gingivitis.

On the face of the great amount of literature that has been given us upon this subject, and in view of the rapid strides of progress and advancement achieved in this line, it seems indeed a deplorable condition when one can conscientiously and candidly assert that only from 15 to 25 per cent. would be a fair estimate of those roots, which after carrying crowns for a time, present no indications of this condition, and yet we are convinced by close observation that, on an average, such is the case.

The question naturally arises then as to its probable cause.

Since a very great percentage of the crowns now in use are made of gold, or having gold bands, would it be just to attribute it to the assertion sometimes made that the tissues of the mouth take unkindly to that metal? when we will perhaps turn right around and advocate a gold plate to the next patients presenting themselves; and when we know as an absolute certainty, vouchsafed to by proof and experience, that there is no substance, either metallic or mineral, that when brought into contact with the tissues of the mouth presents so many favorable points as gold. Yet for all of that, in crown-work we can but acknowledge the frequent presence of an unfavorable condition, but does it not seem very plausible that the fault lies not in the metal, but in its unnatural relation to the root and tissue by virtue of poor adaptation.

It is an acknowledged fact that the tissues take very kindly to porcelain and that a much greater proportion of crowns made of that material are worn with comfort and without the presence of inflammation and subsequent recession, than are those made of gold; but it looks probable and in fact seems evident to me that that difference is due in main to the fact that a porcelain crown when adapted and in position presents always this favorable condition, a perfectly smooth vitrified highly polished surface, with a rounding edge. And as this is the most desirable and natural condition, why then would not the tissues take kindly to it and remain normal and healthy? when, unless there is irritation from an improperly prepared root, a poor fitting band, or impingement upon the membranes caused by driving the band on too far, there is absolutely nothing to prevent.

We are impelled to maintain without hesitancy that this can be accomplished and the same results secured in the use of a gold crown, if we will but take the time, pains and precaution to properly prepare our

roots in the first place, that the band may be fitted accurately and closely without having to drive them on with mallet or sledge hammer ; that they may leave no semblance to a shoulder, and then round and polish the edge nicely and give to the metal a high and smoothly polished surface-

It certainly seems consistent and reasonable then to concede the fault either to the preparation of the root or the adaptation and finishing of the band, for whether it be metal or porcelaik. unless the proper precautions are observed to avoid all irritating influences, the ultimate result must be inflammation, and in its *remedy* there is but one definite conclusion, the same as is applied to inflammation of any part and is synonymous with its treatment—remove the cause.

In the fittings of bands many seem inclined to think that they should fit the root so closely as to necessitate their having to be driven into place, and that they should extend as high root-wise as is possible ; while almost the reverse is suggestive of the best results, for if the root is properly prepared by a sufficient removal of the enamel to parallel the surfaces, that the diameter may be no greater at any point than under the free margin of the gum, the band fitted close and snug, being only permitted to pass high enough up on the root to secure a purchase upon same and pass just beneath the gum line, and after mounting, the thorough removal of all particles of surplus cement, then burnishing the edge up closely to the sides of the root with a smooth foot plugger or burnisher in hand or automatic mallet, no conditions will be present that will by producing irritation, cause or promote the occurrence of inflammation or gingivitis.

—H. J. GOSLEE, *Dental Review*.

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### Dangers of Cocain.

The recent death of a patient in a physician's operating room from the effects of cocaine again calls attention to the dangers attending the use of this drug. While in this instance no blame can be attached to the medical attendant for the untoward result, it at the same time recalls the deadly power of this drug. The number of fatal cases so far reported is happily not many, but those of severe poisoning are quite numerous. The employment of cocaine is largely on the increase, it being frequently prescribed by druggists for the relief of toothache and other forms of local pain. It is also used by dentists, and oftentimes in a most reckless manner.

The poisonous properties of cocaine seem to be especially pronounced when used in the urethra, nose and mouth. It is less so when employed in operations on the trunk and extremities. This raises the question as

to whether the additional danger is due to the facility of absorption from these parts or to the semi-erect position in which most operations on the nose and mouth are most frequently conducted. Solutions of too great strength are often employed; some of them being made extemporaneously by adding a few grains of the drug to an unknown quantity of water. The studies of Schleich have shown that when efficiently used, very weak solutions may suffice for lengthy anesthesia of extensive areas.

We feel at this time that a note of warning is needed regarding the use of cocaine. It should never be prescribed or used by any but qualified medical practitioners. When used by them it should be in solutions of known strength, and if for operations, preferably by the intra-cutaneous method of Schleich. The patient at the beginning of an operation in which cocaine is used should be placed in a horizontal position, which should be maintained until the effect of the drug wears off.—*Journal Amer. Med. Ass'n.*

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### Repairing Bridges and Crowns by a Process of Soldering in the Mouth.

It is important to remember that the closer the surfaces of metal come together the stronger will be the union, and therefore it is absolutely necessary to get the two backs well into apposition over their entire surfaces. Those operators who wish to adopt this method, and are not expert in soft soldering, are advised to practice it out of the mouth, so that no hitch may occur during the operation, as it is in the rapidity of the soldering which prevents the heat from reaching the patient in any important degree.

The method of procedure is as follows: A rather thin porcelain flat tooth is selected and backed with No. 7 gold. The pins are cut short and riveted down into countersunk holes, and then still further attached to the back by melting gold solder over them. The back is then filed down perfectly flat and smooth. The old back remaining in the mouth is also trimmed smooth, all prominences caused by the old pins, etc., being burred down. The new tooth is let down till it takes its proper position in the mouth. The new back is "faced" with an excess of "pearl" solder, by means of the soldering iron, which has itself been previously faced with the same solder. A piece of blotting paper is inserted under the bridge (if bridge it be) and allowed to project each way, to protect the gum and palate from radiant heat from the "iron." A roll of bibulous paper is placed in the labial sulcus and a napkin applied in the usual way.

The old back in the mouth is then faced with the same solder by

means of the soldering "iron." Hydrochloric acid and zinc is used as a flux. The new tooth is then placed in position, held there, by the finger, a small piece of bibulous paper intervening, and the solder is melted by touching the "iron" to the tips of the two backs where the solder comes to the edges. The "iron" must carry a bead of molten solder on its end. The union is known to be complete when the new tooth is felt to suddenly sink down into its exact position under the pressure of the finger. After each application of heat in the mouth, the work is *immediately cooled off* with a cold wet swab of cotton wool. Several other details to observe are the following: If the new tooth is to be next to a contiguous live tooth, see that both the backs, old and new, are just free of it, and place a single thickness of blotting-paper between them. See that the new back does not extend so far as to touch the gum. Let the back of the new tooth be as large as possible and its lateral edges not bevelled. See that in facing the backs with pearl solder, the solder be carried well over the cutting edges. See that the "iron" is as hot as possible, always provided it be not over-heated and the facing of solder spoiled thereby. Test the heat of the "iron" by seeing that it will instantly melt bits of solder when pressed upon them. The "iron" must be very hot, so as to do the work quickly, and quickness is the soul of the process. When attaching the tooth do not attempt to conduct the heat through the old back, but apply the "iron" to the cutting edges of the backs, so that it comes into contact with the solder previously put upon them. This is the most important detail of all, as *no amount of heat* will do the work properly *through the old back*.

The melting of the solder between the backs seems to be induced by actual contact of that solder with the molten solder constituting the facing of the "iron." The molten condition is evidently passed on from molecule to molecule, each molecule when falling into the molten state knocking down the one next to it in a way which seems to be analogous to the way in which a row of nine-pins may be made to knock each other down, or a row of dominoes set up on end. This explains why the molten solder constituting the facing of the "iron" must be placed against the solder already in the "backs." Mere heat will not suffice.

In this way a complete melting of the solder between the backs is effected, no matter how long the tooth. The length of time required to effect this is about two to four seconds, varying with the size of the tooth.

If the tooth after being soldered on is found to be in an incorrect position, it must be melted off again by again applying the "iron" to the tip of the new back, touching the solder, and pulling it forward with the "iron." The reason for putting an excess of solder on the new back when facing it, is, that when it melts it allows the tooth to sink under

the pressure of the finger, and so tells when the melting is properly done, and it also ensures there being plenty to fill up all the spaces. The excess is attracted away by the "iron." I have done some cases with teeth backed with dental alloy, but am not sure that the solder attaches quite so well to this as to gold, but when using gold I find it does not do to use a gold of less thickness than No. 7, as the solder in that case has a bad effect on the gold. In wear, the soft solder does not disintegrate nor suffer in any way, nor does it give rise to an unpleasant taste, but the bite must always be made quite free of the new tooth and of its "back."

—H. BALDWIN, *Dental Record.*

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### Dr. Harlan on Nitrate of Silver.

I hold in my hand a number of specimens that have been treated with nitrate of silver, not by the cataphoretic process, but by ordinary processes of making solutions from 10 per cent. up to a saturated solution and using freshly extracted teeth to be dropped into these solutions and allowed to remain for from three to five or six days; then taking them out, simply washing them, and making a cut on the surface of the tooth. Here are four roots that have been filled, the interior of which roots were first treated with from 30 to 50 per cent. solutions of nitrate of silver and allowed to remain twenty-four, forty-eight, seventy-two, and ninety-six hours, and without cleaning the roots out or drying them, the root fillings were forced in and the teeth cut by Dr. Wikoff. They were all planted in plaster of Paris, so that the roots could not be seen. One in particular, a molar tooth, it was the only molar the roots of which had been filled with an almost saturated solution of nitrate of silver on Saturday morning and allowed to remain until Tuesday afternoon, and cut down by Dr. Wikoff this morning. These specimens speak for themselves. You can see on the reverse side the intense blackening of the cementum, and on the specimens of root fillings, one of which has been filled with amalgam with the white solution of nitrate of silver is another. After a lapse of three months or a little more it does not show appreciable discoloration. I have one specimen more than three years old, and I have other specimens which were made in September, 1894; I pass them around simply in the interest of accuracy of observation. These teeth were all moist. Those not freshly extracted were previously soaked in water for days, so that they became thoroughly moistened.

One of the specimens I made was kept in moisture and stayed there between two and three months, being looked after by my son. He wanted to fill the root of that tooth, and it was kept in a jar to see

whether any change took place. I am not advocating the filling of roots of teeth with nitrate of silver. I simply show the results of the silver on the enamel, dentine and cementum, and under the circumstances I have related nitrate of silver, as you know, as soon as it parts with its oxygen ceases to be nitrate of silver and deposits the oxid which in time is converted into metallic silver, not wholly but partially. Oxid of silver is not a penetrating agent. Nitrate of silver, as any one would know from looking at a photographer's fingers, is an agent that is self-limiting, that is, will penetrate a certain distance and then stop on account of the formation of the oxid, which prevents its further penetration.—*Dental Review.*

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### Teeth Irregularities and their Correction.

In an article in the *Cosmos*, Dr. Talbot explains his method as follows: "This method consists in removing entirely the alveolar process in the line of travel of the tooth to be moved, leaving a small amount of process about the root of the tooth, holding intact the peridental membrane. This is accomplished with coarse-cut Revelation burs, or those that will cut in all directions. . . .

If the superior incisors are to be carried back, cut semi-circular spaces just posterior to the teeth to be moved. To carry a cuspid into place which is erupting into the vault of the mouth, remove the alveolar process in the direction of the line of travel.

In moving teeth laterally by a jackscrew, it will be found that not infrequently one tooth moves faster than the other. To bring both to their proper position cut out the alveolar process on the side of the slowest-moving tooth, and both will come into proper position. To rotate a tooth, cut a circular groove as deep as possible around the tooth, leaving enough process to hold the peridental membrane intact. In this manner teeth may be moved very rapidly and without much pain. This should always be done by means of screws. By this method we have the tooth or teeth to be moved completely under control. Any of the teeth in the mouth may be used for the fixed point of resistance, thus doing away with all unsightly appliances outside the mouth. When in place, they should be anchored in the usual manner. Antiseptic washes should be used from time to time, such as one per cent. corrosive sublimate, listerine, or five per cent. carbolic acid.

In operations of this nature the peridental membrane and also the periosteum are apt to be injured. This was the particular question in recommending it to the profession. Although I have had a few cases of infection, I am quite certain now that such injuries are not of any serious

consequence, since with proper precaution no bad results will follow. With this mode of treatment patients are saved time and money, and the operator worry."

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### A Form of Clamp for Buccal and Labial Cavities.

I think you will admit that for soul-stirring and sweat-producing conditions there is nothing that will take rank with the preparation and filling of buccal cavities in lower molars and bicuspid, and the labial cavities of the central incisors and anterior teeth. There have been a great many clamps devised for this purpose, but it has seemed to me they fall far short of the one thing, and that is, to reach exceedingly bad cases. Those clamps that have been invented will reach the ordinary case and Dr. Dunn's recent clamp goes a step farther than any of the others; but still there is a class of cavities, taking molars in particular, that the clamps on the market will not reach. I have devised something and have been using it recently, which I think will serve the purpose.

I take small tempered steel wire and form it into little wedge-shaped points similar to a hatchet excavator tapered flat toward the point. These vary from one-sixteenth to one-eighth of an inch long. These wedge-shaped pieces of steel are too small to handle with pliers and to put them in the difficult positions in the mouth which we have to contend with. So I have taken a plugger point and in the end of it have bored a small hole half the depth the pin is long, so as to form a pocket for the pin to be held in. I then magnetize this point, and the magnetism holds the very small steel wedge into the hole with no danger of its dropping out. It holds it firmly in the end of the piece. I then put the rubber dam over the tooth, and with the little point in the instrument draw it down until I get to a firm point well below the margin of the cavity in the cementum, and when I get it in a firm position by giving one blow or two I drive the wedge-shaped point into the cementum. At first thought some one would say that this would injure the cementum; but the fact that you are able to get it down there and are able to put in a perfect filling and finish it properly, more than outweighs any apparent injury which you may do to the tooth. You can do no injury anywhere, because it is well beneath the gum, and the pericementum is elastic enough to close the wounds. I have a tooth in my office which I have punched in there a hundred times, and Dr. Newkirk tried yesterday to find the defects. It does not show any blemishes. Take a tooth only filled once, we can do no possible injury to it. The lingual surface of the tooth does not need any clamp.—W. H. TAGGART, *Dental Review*.

### The Physiology of Nerve.

Dr. Augustus Waller, F.R.S., who gave the opening address at the Medical Society of University College, took as his subject "A New Chapter in the Physiology of Nerve." He pointed out that hitherto in investigating the results of stimuli applied to a nerve, the answer was an indirect one transmitted through muscle or some other tissue. It had seemed to him better to put the question "How do you do?" directly to the nerve itself, and get a direct answer. For this purpose the nerve connected with electrodes is placed in a glass "gas-chamber," and the results of a succession of stimuli at minute intervals can be shown graphically as normal replies. On introducing certain vapours, as chloroform or ether, into the chamber the effect upon the nerve is easily seen, and the same holds good when the nerve is bathed, say for one minute, in a solution of different salts. A series of lantern slides demonstrated very well some of the results Dr. Waller has obtained with such tests. Thus it appeared that whilst ether only anaesthetised the nerve and normal responses were afterwards resumed, in the case of chloroform the nerve was killed.

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### Formic Aldehyde for Root Canal Treatment.

A patient from a neighboring city presented with a pulp congested. An arsenical application was made, and, at a later sitting, the pulp was removed. Hemorrhage followed and the pulp-canal was treated with iodoform-ether. Comfort obtained. Patient was taken sick before appointment to fill arrived, and before she could come the tooth became very sore. She removed the temporary filling, obtaining comfort, but did not present herself again in over a month, when the tooth had again become very sore and inflamed. A soothing application restored comfort, and an appointment made for the ensuing week for filling. This date was again broken because of sickness, and comfort was maintained for three weeks. The temporary filling was again removed, and the tooth left open for nearly five months, at times, however, becoming very sore. In the meantime, the patient being unable to travel, sought temporary relief from the local dentist, which, however, was not afforded, and extraction was advised, as nothing could be tolerated in the tooth. This was not consented to by the patient, who endured the occasional pain and soreness until she was able to present herself again.

The history of her case since the last visit was narrated, and it was decided to use formalin. This treatment was successful. It was deemed necessary to make three applications, when the pulp-canals and tooth were filled. Comfort has continued.—S. G. PERRY, *Items.*

**Anemia: Its Varities, Causation and Treatment.**

Dr. B Thorne, of London, in discussing a paper having above title before the British Medical Association, stated that he had found three features to be common to all cases of anemia and chlorosis? (1) Excess of uric acid in the blood, with more or less urinary inhibition; (2) a diminished vascular capacity; (3) dilatation of the heart, mainly but not exclusively, of the right side. For treatment he recommended (1) exhibition of ferruginous preparations with or without arsenic; (2) diet and gastro-intestinal antisepsis by means of salicylate of bismuth and minute doses of some mercurial preparations; and (3) the Schott methods of exercises and baths, which greatly promote the metabolism of the body generally.—*American Therapist.*

**EDITOR'S NOTES.****Reflections.**

THE meeting of the Ohio State Dental Society, just held, was the best, all things considered, that the society has held for years. There was ample material, of excellent quality, and an unusually large number of dentists in attendance. A notable feature was the presence of so many of the young men in the profession that not only attended the meeting but took part in its deliberations. This we believe every dental society should encourage, for great latent power lies in the young men and it requires only a little persuasion or encouragement to draw it out. Do not oppose or ridicule everything they say, as some in the profession have for many years been wont to do, but assist them, give them encouragement, help them to establish confidence in themselves and then you have taken a long step toward building up dental societies. We believe that there has been no one thing that has done more toward stunting the growth of societies, or limit their interest and usefulness, than the mouths of the chronic kickers in the dental profession, who oppose everything that is advanced unless it corresponds exactly with the pessimistic view they take of things. The young men will not get up in society meetings of be made targets of, and they cannot be expected to attend meetings year after year to listen to the repeating of old ideas

that have long since been learned by heart from their many repetitions. Make a special effort to get the young men into societies, and then treat them respectfully after you do get them there. If all other societies in the United States will encourage the young men as the Ohio State Dental Society, the Northern Ohio, and others, have done, a few years hence will show not only a greatly increased membership and attendance, but a higher class of work, for this is an age of investigation and the young men are interesting themselves along these lines.

Another good feature of the meeting was the election of officers as early as the night of the first day's session, the installation not taking place, however, until later. This arrangement gives the new president an opportunity of appointing his committees so that they can go ahead and arrange the program, through personal solicitation, for the next year's meeting, while the members are all present. This saves a vast amount of correspondence and time to the chairman of the executive committee, and in other ways assists materially to facilitate arrangements for the next annual meeting. Before the society adjourned the committee made the announcement that the program for next year was about made up.

The Ohio State Society, and probably there are others, has had difficulty in keeping up its membership among those whose annual dues were in arrears, for, after two or three years the arrearages amounted to so much that the member would rather remain at home than pay the amount of accumulated dues. In consideration of this the society this year adopted the following:

"Members will hereafter not be liable for the year's dues in this society, unless in attendance at the annual meeting of that year."

It is hoped that this action will be the means of keeping up the membership in the society and increasing the attendance at its meetings.

Other resolutions of importance were passed and are presented on another page in this issue.

One, regarding the unification of our dental laws, something greatly needed, and another regarding the appointment of dentists to serve the army and navy of the United States.

The papers, read at the meeting, and discussions will appear in this and subsequent issues of the OHIO DENTAL JOURNAL.

### New Publications.

THE AMERICAN TEXT BOOK OF PROSTHETIC DENTISTRY in contributions of eminent authorities. Edited by Charles J. Essig, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy, Department of Dentistry, University of Pennsylvania. Lea Brothers & Co., Publishers, Philadelphia; 1896. Price, cloth \$6.00; leather \$7.00.

This work of 750 pages in the most complete of any, on prosthetic dentistry, yet published. The idea of assigning the various subject to different men prominent in the profession and especially fitted for the task, was a most excellent one, as the result shows.

In the preface the author says: "It is a prominent purpose of the work to sift from the multitude of devices and operations which have been advanced, those which have so stood the test of time as to receive the endorsement of continued application by the most skilled and experienced prosthodontists, and to describe in detail those principles which are applicable to the greatest number of cases."

The book is divided into twenty-one chapters. Chap. I, on The Dental Laboratory: its Equipment and arrangement, and

Chap. II, Metals and Alloys used in Prosthetic Dentistry, are by Chas. J. Essig, M. D., D. D. S. Chap. III, Principles of Metal Work, by C. L. Goddard, A. M., D. D. S. Chap. IV, Moulding and Carving Porcelain Teeth, C. J. Essig, M. D., D. D. S. Chap. V, The Preparation of the Mouth; Choice of Material and type of Denture, Chap. VI, Taking Impressions of the Mouth, Chap. VII, Making of Models and their Preparation, Chap. VIII. Dies, Counter-dies, and Moulding, and Chap. IX, Swaged Metallic Plates are all prepared by H. H. Burchard, M. D., D. D. S. Chap. X, The "Bite" or Occlusion, by Grant Molyneaux, M. D., D. D. S.

Chap. XI, Selecting and Fitting the Teeth; Attachment to the Plate; Finishing, by H. H. Burchard, M. D., D. D. S. Chap. XII, English Tube Teeth; Their use in Plate, Crown, and Bridge-work, by C. J. Essig, M. D., D. D. S. Chap. XIII, Continuous-Gum Dentures, by Ambler Tees, D. D. S. Chap. XIV, Cast Dentures of Aluminum, and Fusible Alloys, by C. L. Goddard, A. M.,

D. D. S. Chap. XV, Vulcanized Rubber as a Base for Artificial Dentures, by C. J. Essig, M. D., D. D. S. Chap. XVI, Celluloid and Zylonite, by W. W. Evans, M. D., D. D. S. Chap. XVII, The Temperaments and the Temperamental Characteristics of the Teeth in Relation to Dental Prosthesis, by Alton Howard Thompson, D. D. S.

Chap. XVIII, Artificial Crowns, and Chap. XIX, The Assemblage of United Crowns (Bridge-work), by H. H. Burchard, M. D., D. D. S. Chap. XX, Hygienic Relation and Care of Artificial Dentures, by Chas. J. Essig, M. D., D. D. S. Chap. XXI, Palatal Mechanism, by Rodrigues Ottolengui, M. D. S.

While all of the articles are excellent in themselves, we believe certain portions of some of them could have been omitted with profit, while others rightly belong to advanced work. Writers of text-books are apt to be too diffusive. These books should be simplified as much as possible, and the material presented concisely, yet understandingly, and in progressive order. It seems as though it would have been more suitable to have given the student the material on preparation of the mouth, taking impressions, making models, etc., immediately after the introductory chapter on laboratory and its arrangement, instead of the articles on metallurgy, appliances for the correction of irregularities, materials for continuous-gum work, and carving of block teeth. According to our idea these subjects should be taken up later, and it is a question whether it is not better to have metallurgy in a work by itself. The tendency is to crowd too much into one text-book and it becomes at least cumbersome. Still the extra material in this book makes it that much more valuable to the general practitioner.

There are but few errors. It seems, however, that the illustration of the Custer Oven should be on page 264, where the furnace is described, instead of on page 29, where the fusion of platinum with carbon point and carbon receptacle, are described, for this is something entirely independent of the furnace. On page 264, where the furnace is described, no reference is made to the illustration on page 29. On page 375, last line, the date 1869, should read, 1896. In the article by Prof. Wilson, on staining of artificial teeth, page 268, some of the most important points have been omitted. The errors are few, however, and taken as a whole the work is an excellent one. Articles worthy of especial men-

tion are the chapters by C. L. Goddard and Grant Molyneaux. In fact, each has done his part well. The illustrations are numerous and excellent, many half-tones being presented, and the paper, press-work and binding are all that could be desired.

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TRANSACTIONS ILLINOIS STATE DENTAL SOCIETY—1896. As usual the transactions of this society contain valuable material. The book contains 192 pages, is well edited, neatly printed and bound in cloth. Pub. Committee, Louis Ottosy, A. W. Harlan, E. Noyes.

TRANSACTIONS CALIFORNIA STATE DENTAL SOCIETY 1896. This volume of 135 pages contains papers of interest on many subjects that are of importance to the progressive dentist.

THE ODONTOBLAST, a neat 24 page monthly, published by the students of the Dental Department of the Detroit College of Medicine. The journal is a creditable one and we wish it success.

#### BOOKS RECEIVED.

TURNBULL'S ANESTHESIA, published by P. Blakinson Son & Co.  
Price \$2.50.

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## CORRESPONDENCE.

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### A Correction.

EDITOR OHIO DENTAL JOURNAL:

DEAR SIR:—In reading my article in your Dec. JOURNAL last evening I noted a very grave error in the second paragraph, which says, hence, "Dr. Black's deductions, that gold is the best saver for all teeth."

It should have read, "hence the possible deductions, that gold is the best saver for all teeth." I must confess that I was negligent in reading the proof, for at the time, I was very busy, and went over the matter hurriedly. Dr. Black never to my knowledge made any such statement, and I never intended quoting

him for the same. I therefore beg Dr. Black will accept my apology, and believe me, an appreciative admirer of his good work.

Very respectfully yours,

F. T. VAN WOERT.

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## BRIEFS.

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**To Strengthen Plaster Teeth in Partial Cases.**—Place short pieces of stiff wire or wood vertically in the depressions made in the impression by the teeth.

**Fungus Growth of the Gums.**—Some cases of fungus growth of the gums will improve rapidly if you use sulphate of copper in powder or the solid crystals. Antidote with carbonate of soda.—*Dental Review*.

**Treatment of After-Pain of Wedges and Ligatures.**—I am charmed and enthusiastic over the pleasant effects of listerine and water, equal parts, for the after-pain of wedges and ligatures.—*C. B. Colson, Items*.

**The Peripheral Neuralgias of Traumatic Origin.**—Dr. H. Manley has expressed the belief that the protoplasm of the blood plays a direct and important part in the causation of painful affections of the nerves.

**Talk Sense.**—One would think, by the constant firing of words at your patient, you thought the mouth was open to receive them. No; they prefer your work. Don't talk much; and when you do say anything, don't let it be nonsense.—*Southern*.

**Simple but Effective.**—If one takes the trouble to crown the teeth or roots and utilize them for clasping, for the retention of the case, one has the most simple form of work, and at the same time the most efficient that can be constructed.—*H. Rose, Brit. Jour.*

**Have Self-Confidence.**—In the use of all cocaine preparations the operator should possess confidence in the agent employed and convey to his patient, by his calm, deliberate procedure, a confidence in himself, else the better results are not obtainable.—*Items*.

**Boroglycerin.**—Using boroglycerin in hot water—10 per cent.—adds to its effectiveness when you are about to begin the removal of deposits from the roots of teeth. The patient will notice the change. Condyl's fluid should be used about 110° F.—*Dental Review*.

**Use an Operating Stool.**—There is no novelty in using the operating stool, but it is a practice which is but too rarely followed, and which, though it may present some inconveniences at the first trial, is really quite as suitable for work as the standing position.—*From Ed. Dental Record.*

**Precaution in Cavity Preparation.**—These few points, i. e., keeping the point of contact away from the union of filling and enamel, and the thorough beveling of all edges, constitute, in my opinion, the most important of precautions in cavity preparation.—*F. Schumacher, Stom. Gazette.*

**The Dental Mechanic vs. The Dental Artist.**—A knowledge of the distinguishing characteristics of the various temperaments and the style of teeth which conform to nature's types in the physical organization marks the difference between the dental mechanic and the dental artist.—*J. P. Gray, Cosmos.*

**For Those Wearing Artificial Plates.**—

R	Alcohol (duressou du para) . . .	3	1 $\frac{3}{4}$
	Tinet. Krameria . . . . .	m	150
	Thymol . . . . .	grs.	7
	Ess. Oil of Thyme . . . . .	m	7

—*Record.*

**To Prevent Discoloration.**—The color of the tooth is not altered by the death of the pulp if the debris is all removed and it is properly filled before the discoloration takes place. It remains a useful and ornamental part of the human organism, and if anything it is more adherent and firmly fixed in its socket than if the pulp were alive.—*G. P. Claude, Cosmos.*

**Loop Anchorage.**—The idea of loop anchorage is very pleasing to me. Placing the heavy foil over the loop that had been covered by cement, and then doubling the loop over that and crossing back with heavy foil makes a filling that is a lasting monument to one's ability. If the frail walls should break the filling would remain intact.—*F. C. Payne, Stom. Gazette.*

**Partially Dead Pulp.**—The most prominent symptom of the partial death or approaching death of the pulp is a not well-localized, intense pain on the affected side of the jaw, described often as neuralgia, the pain intermittent in character, sometimes described as thumping or hammering, increased in intensity when in the reclining position.—*G. H. Claude, Cosmos.*

**Non-Cohesive Gold for Children's Teeth.**—If I wish to put gold in children's teeth, without the use of the rubber dam, I use the

non-cohesive and protect by napkins; even if I put in a large filling, it is easily done in four or five minutes, and does not matter very much if a little moisture does get to it. That is all right; it will keep that tooth.

—J. D. Patterson, *Western Journal*.

**To Rinse the Mouth after Extractions.**—Boraseptine.

R	Acidi Boraci	3 1 $\frac{1}{2}$
	Glycerini	3 3 $\frac{1}{2}$
	Aqua dest	3 35
	Ess. Mentha. or Rosae	9 s.m
	Mix with equal parts in warm water.	— <i>Dental Record</i> .

**To Grind Down Teeth Painlessly.**—Where teeth are sensitive and require considerable grinding, as for crowns and bridges, apply chloride of ethyl. After its use you can cut teeth all to pieces. By holding it a little distance from and spraying it on the tooth you can take a sharp stone and cut without causing pain, and I have found very little sensitiveness afterward.—*Dr. Platt, Stom. Gazette*.

**A Higher Duty.**—We, as dentists, whose duty it is to care for children's teeth when diseased, to watch with great care the permanent teeth advance and take the places of the temporary teeth, have a higher duty to perform, a duty that may not bring us directly any dollars and cents, a duty that costs us nothing which we can perform as we are about our daily business—the education of our patients in regard to the dental organs.

**Nickel Matrix.**—I have been using a band matrix made of a piece of nickel rolled as thin as I can get it. Then pack amalgam against that and by use of bibulous paper the excess of mercury is removed, the amalgam is very dense and the surfaces published. In my large amalgam fillings, bicuspids and molars, I use this method and in months and years after I am so favorably impressed with it that I make use of it more and more.—*R. H. Cool, Stom. Gazette*.

**Pulpitis.**—I think that oftentimes we have pulpitis from a traumatic injury or a blow, and that it can be relieved in different ways and the pulp still remain alive and regain its normal condition.

Often we have inflammation of the pulp tissue caused by irritants reaching the organs through a carious cavity, and the condition may have disturbed the pulp for one, two or even three days, and still that inflammation may be relieved and the pulp retained alive by careful treatment.

—*D. M. Cattell, Dental Review*.

**Insertion of Artificial Teeth Immediately after Extraction.**

—Regarding this practice, Mr. Houghton said he had practiced this

method himself for some years, and found it very successful. There was less absorption took place, very little discomfort, and the patients were delighted with the results. He always took the impression before he took the teeth out, and made the artificial denture before he extracted the teeth. He had never had any difficulty and thought the method was one they all might practice with safety.—*Brit. Journal.*

**How to Sterilize Cotton.**—A rather ingenious plan for sterilizing cotton is referred to in a French contemporary. A piece of cotton is taken, twisted on a stick or a piece of wood, and dipped into a saturated alcoholic solution of boracic acid for a moment or so. It is then withdrawn from the solution, and a light is applied to it, as the result of which the alcohol burns out, while the boracic acid prevents cotton from burning. Five seconds are enough; as soon as the flame burns green it is extinguished. The cotton remains white, dry, warm, but absolutely sterilized.

**To Force the Gum Back.**—When necessary to force the gum back I usually do so by filling the cavity with cotton saturated with a thick sandarac varnish, allowing it to remain a week or two. It is a mistake to hurry this part of the operation. If the cotton is removed after being in position a few days only, the natural tendency in the gum tissue to resume its position is a serious embarrassment. The cotton will usually remain in place, and causes little or no discomfort to the patient. After the gum tissue has been held back some time, this tendency to immediately return to its former position is largely overcome.—*W. H. Trueman, Items.*

**Density of Teeth and Process of Caries.**—That there is little or no relation between these two conditions seems demonstrated conclusively, and the sooner the profession awakens to a realization of this fact the better it will be for our patients. Thousands of useful teeth have in the past been consigned to the forceps on account of this fallacy, and thousands more will be unless the fallacy be recognized. Until the rank and file of the profession understand that decay of the teeth is a disease influenced by external conditions rather than by the inherent structure of the teeth they are not in a position to intelligently combat the trouble.—*C. N. Johnson, Dental Review.*

**To Expose Cavity Below Gum Margin.**—In cases of excessive proximate decay, when it has extended below the gum margin, I have produced an absorption of the gum, prior to the application of the rubber dam, as follows: I wrap a piece of dental floss or gilling twine twice or more around the tooth, forcing this well up on the neck of the tooth,

and filling the remainder of the cavity with red base plate gutta-perch, forcing this likewise well against the ligature. This will often be but an initiatory step. At the next presentation I will be able to see the condition of affairs better, when I may either repeat the procedure with the ligature as described, or force the gutta-percha between the teeth, crowding it well against the gum margin at the neck of the tooth. It will often be found, in these cases, that there is *a little tongue* of gum which extends into such cavities. I do not attempt the absorption of this, but I dissect it away with a sharp-pointed abscess lance, and, when the bleeding has subsided, proceed as above.—*T. F. Chupein, Items.*

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## SOCIETIES.

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### Resolutions Adopted by the Ohio State Society.

THE following important resolutions were adopted at the recent meeting of the Ohio State Dental Society, and it is desired that they be considered by every dental society in our land, and action be taken regarding the subjects that the good work may be pushed forward :

*Resolved*, That it is the sense of the Ohio State Dental Society, that it is desirable that a Commission on Dental Legislation, consisting of one delegate from each dental society, be formed, whose duty it shall be to secure, so far as possible, uniformity in the laws of the various states.

*Resolved*, That a delegate for such a commission from this state be selected at this meeting.

*Resolved*, That a committee of three be appointed whose duty it shall be to invite all other state dental societies to unite in the formation of the proposed commission, by the appointment of one delegate each.

Since it is a well established fact that no part of the body can be lost or implicated in disease without impairing the whole body, and an equally well established fact that the enlisted men of our U. S. army are entirely without the services which are necessary to keep their dental organs in good order, therefore be it,

*Resolved*, That Congress be asked to provide such services

from the ranks of the regular dental profession in such manner as may prove best. Be it further

*Resolved*, That the Ohio State Dental Society appoint a committee of one who shall have authority to work in this direction with the object of securing such legislation as aforesaid, and be it further

*Resolved*, That we recommend like action from every state dental society in the land.

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### Chicago Dental Society.

THE Chicago Dental Society will celebrate its 33rd anniversary Monday and Tuesday, February 1st and 2d, 1897, by giving a clinic with about twenty-five operators each morning from 9 to 12 a. m. Papers will be read Monday afternoon and evening and Tuesday afternoon, closing the exercises with a dinner at 6:30 p. m. Members of the profession are cordially invited to be present. Headquarters for visitors will be at the Palmer House where special rates may be obtained.

This will be the first attempt since the World's Fair on the part of Chicago dentists to entertain their friends and they hope to have a large attendance.

Full programs will be issued about January 15th, giving the location of clinic rooms, etc.

A. H. PECK, Secretary. LOUIS OTTOFY, President.

Clinic Committee:—E. D. Swain, J. W. Wassall, Louis Ottofy, D. M. Cattell, A. W. Harlan, Chairman, 1000 Masonic Temple.

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### OUR AFTERMATH.

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**NEW PLATINUM FIELDS.**—It is reported that a valuable find of platinum has been discovered near Coolgardie, in Western Australia.

**MARRIED.**—Dr. O. C. Kerlin, of Greenville, O., and Miss Avarella Fahnestock, of Versailles, were married Thanksgiving day.

**NEW OFFICERS ELECTED.**—At the annual meeting of the Cleveland City Dental Society, the following officers were elected for the ensuing year: G. H.

Wilson, president; J. W. Van Doorn, vice-president; W. A. Siddall, secretary; W. A. Price, treasurer.

NEW MEMBERS ADDED TO THE OHIO STATE DENTAL SOCIETY, at the recent meeting, were as follows: W. A. Price, Cleveland; H. B. Hinman, Bucyrus; S. T. Yaple, Chillicothe; S. D. Ruggles, Portsmouth; W. S. Locke, Cincinnati; C. H. Wright, Fredericktown; H. C. Matlack, Cincinnati; H. G. Husted, Oberlin; E. B. Lodge, Cleveland; C. G. Myers, Cleveland; J. K. Smith, Zanesville; W. T. McLean, Cincinnati; C. E. Tenney, Sidney; Otto Marx, Toledo; H. E. Harlan, Toledo; W. Buzzell, Port Clinton; C. S. Conner, Marietta; Oscar Miesse, Columbus; C. D. Miles, Troy; H. M. Marlatt, Belle Center; W. H. Rowand, Bellefontaine.

DIED—HEITZMAN.—Dr. Carl Heitzman, the noted histologist and pathologist, died of hypertrophy of the heart, at Rome, Italy, Dec. 6 1896, aged 60 years. Dr. Heitzman was an earnest investigator and his researches have added much to science. He opened a histological laboratory in New York city in 1874, and Drs. Bödecker, Atkinson, Abbott, Mills, and others were taught by this distinguished histologist. Bödecker has followed out many of the teachings of Heitzman, as will be seen by a study of his work on Pathology. Some of Heitzman's ideas have been severely criticised, but not yet proven incorrect. Thus our great men pass away, one by one.

OHIO STATE DENTAL SOCIETY OFFICERS FOR 1897: L. E. Custer, Dayton, president; Grant Molyneaux, Cincinnati, vice-president; L. L. Barber, Toledo, second vice president; L. P. Bethel, Kent, secretary; C. I. Keely, Hamilton, treasurer. Board of Directors, 3 years—J. R. Callahan, Cincinnati; C. M. Wright, Cincinnati; O. N. Heise, Cincinnati; W. D. Snyder, Sidney. Executive Committee—J. R. Callahan, chairman, Cincinnati; H. C. Matlack, Cincinnati; J. F. Stephan, Cleveland; L. L. Barber, Toledo. Committee of Arrangements—A. F. Emminger and H. B. Bartilson, Columbus. Committee of Clinics—W. H. Todd, Columbus; W. H. Hersh, Piqua; H. Barnes, Cleveland; H. T. Smith, Cincinnati. Publication Committee—L. P. Bethel, Kent; J. Taft, Cincinnati; J. S. Converse, Springfield. Membership Committee—Chas. Welch, Wilmington; P. S. Bollinger, Dayton; F. C. Kemple, Bellaire.

PATENTS RECENTLY GRANTED OF INTEREST TO THE DENTAL PROFESSION.—  
Frederick S. Belyea, Brookline, Mass., Dental Plugger, No. 570,864.

John F. Adams, Worcester, Mass., Chin-rest for dental operating chairs, No. 571,209.

Henry D. Justi, Philadelphia, Pa., Support and Carrier for artificial teeth, No. 571,166.

Robert N. Stockton, Philadelphia, Pa., Dental Plugger, No. 570,176.

Louis L. White, Oakland, Cal., Mold for shaping metallic tooth-crowns, No. 571,102.

John S. Campbell, Paris, France, Artificial Teeth, No. 571,644.

Frank Comer, London, England, Bridging Teeth, No. 571,556.

John T. Barker, Wallingford, Conn., Dental Instrument, No. 571,965.

Herbert F. Harvey, Cleveland, Ohio, Dental Obtunder, No. 571,970.

Frederick C. Ries and H. H. Johnson, Macon, Ga., Dental Engine, No. 572,030.

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## CONTRIBUTIONS.

### Relative Efficiency of Various Current Controllers for Cataphoresis.\*

BY W. A. PRICE, D.D.S., CLEVELAND, OHIO.

IT is my purpose in this paper to confine the discussion to the various principles used and not to mention individual instruments.

I must express my obligations to Professors Miller, Langley and Carter, all of Case School of Applied Science, for their excellent assistance in experiments and tests, and for the use of very excellent scientific apparatus, without which I could have done but little.

The function of a controller is to furnish an electric current absolutely at the will of the operator. There are at least seven distinct varieties of instruments on the market for this purpose. Let us note the distinctive characteristics of each.

First, the water rheostat, Fig. 1, which is placed in series with the battery and patient. One pole of the current is placed in the bottom of a jar of water, "J" and the other attached to a sliding post "R." The current passes through the patient, the water, and the batteries in series, and is controlled by varying

\* Paper read at Ohio State Dental Society, Columbus, December, 1896.

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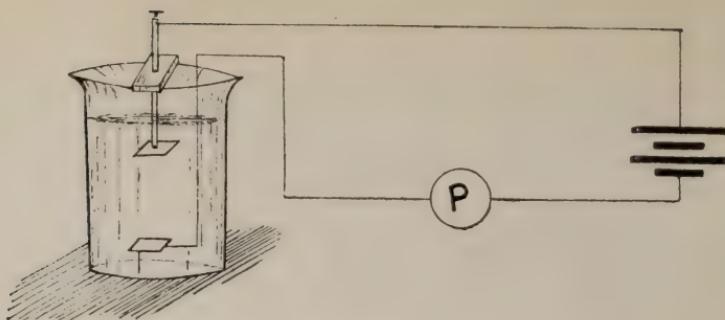


Fig. 1.—Liquid Resistance.

the distance between the end of "R" and the bottom of the jar, the amount of current being controlled by the amount of water.

The next Fig. 2, is constructed on the same principle, except

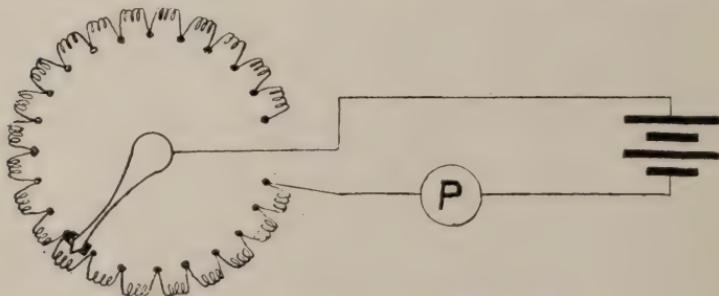


Fig. 2.—German Silver Resistance.

that the current goes through German silver wire, instead of water, and the amount of current is controlled and varied by the amount of wire put in the circuit. As in Fig. 1 the current passes through the patient, the rheostat and the batteries in series.

Fig. 3 is identical in principle, but instead of passing the

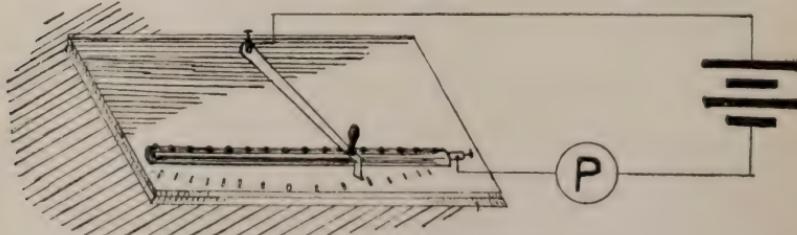


Fig. 3.—Carbon Rod Resistance.

current through fine wire, it is passed through green carbon of relatively a very high resistance. The piece of carbon has little screws inserted, very closely together, and the resistance is increas-

ed by moving the contact lever farther from the end, to which is attached the other pole of the current.

Fig. 4 is very similar to Fig. 3 except that it is another form

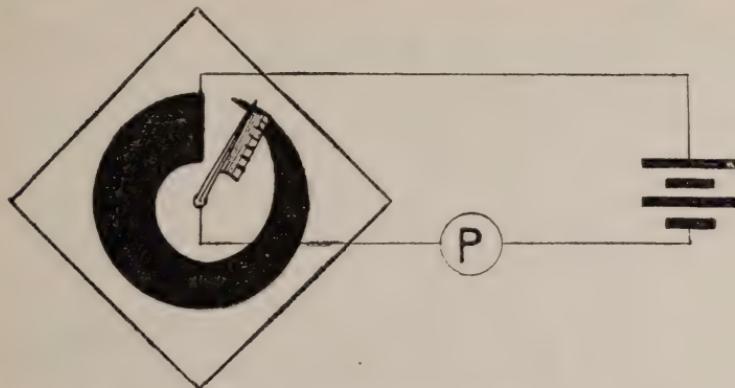


Fig. 4.—Graphite Resistance.

of carbon, namely: graphite baked on a piece of slate or glass. The current is controlled by the position of the lever which has a metallic brush contact with the graphite. As in all the preceding forms, the current goes through the patient, rheostat and the batteries in series.

In the next, Fig. 5, the current is taken from the 110 volt

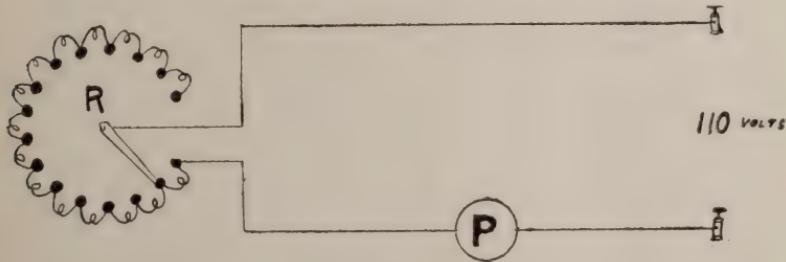


Fig. 5.

circuit, and passed through sufficient resistance, usually graphite or powdered carbon, to cut it down to a sufficiently low potential. Necessarily a much larger resistance is used.

In Fig. 6, we have an entirely different principle for controlling the current, which is taken from the 110 volt circuit, and two paths are made for it to flow through. The one through the patient, and the other through a variable quantity of German silver resistance wire, some resistance is put at L or M. The ratio

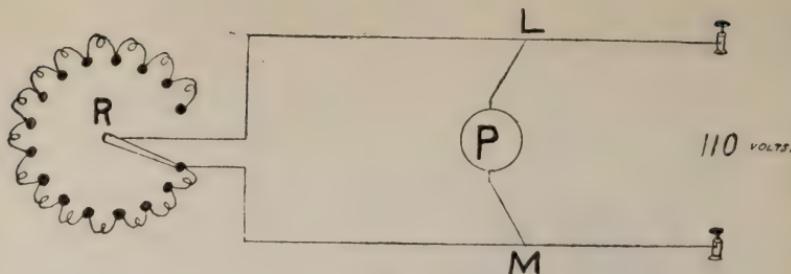


Fig. 6.

of these currents to each other is inversely in proportion to the resistance of their path. For example, if the path L, P, M, Fig. 6, has a total resistance of 20,000 ohms and the path L R M has a resistance of 2,000 ohms, the relation of the current flowing through L P M to the total current flowing is as 2,000 is to 20,000 plus 2,000 or  $\frac{1}{11}$ ,  $\frac{10}{11}$  flowing through L R M. By varying the relation of the resistance in these two paths, the current in both is varied, so the resistance of the patient is fixed, the current in that path, viz: L P M is varied by changing the resistance of the path L R M. By increasing the resistance of L R M the total amount of current flowing through the two paths is diminished in proportion to the total increase or resistance

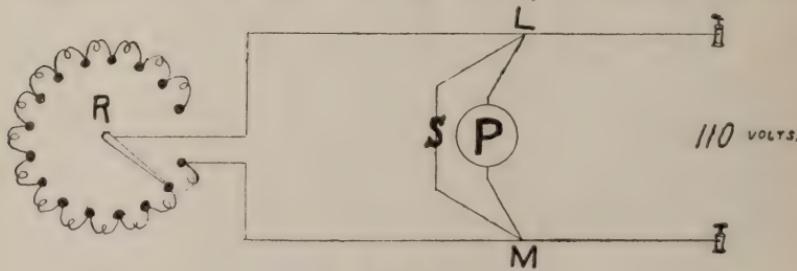


Fig. 7.

of the combined paths. The next Fig. 7, is similar to the last, except that it has a three way shunt. Two of them are constant, viz. L P M in which the patient is the resistance, and L S M, which is a definite amount of German silver wire. The third, L R M has a variable amount of resistance wire, and the relative amount of current flowing through these paths is varied according to the relation of their resistances, always in inverse proportion, and is varied by changing the amount of resistance in L R M. In the last Fig. 8, the principle is identical with Fig. 6,

the difference being only in the source of current. In this case it is batteries instead of the 110 volt circuit.

Just here let us review some of the laws of electricity. First, the amount of current flowing depends on two things, the electro motive force, or potential, or voltage, and on the amount of resistance in the path.

The unit of electric pressure is a volt. The unit of current strength is an ampere, and is the strength of current necessary to decompose .09326 milligrams of water in one second. A milliampere is the one-thousanth part of an ampere. The unit of

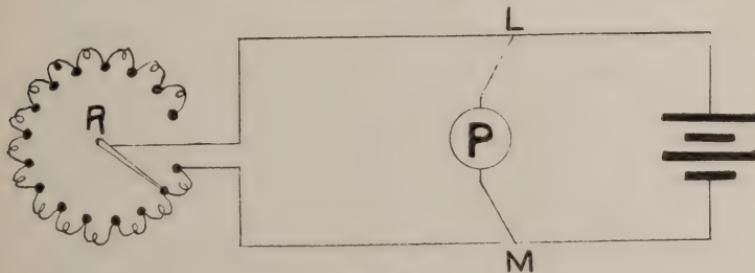


Fig. 8.

resistance is an ohm and is the amount of resistance through which one volt pressure will produce one ampere of current. This is simply one way of expressing Ohm's law, which is, that the electric pressure divided by the resistance is equal to the current. The electric pressure is expressed as the voltage; the resistance as ohms; and the amount of current flowing as amperes. The volts over the ohms equal the amperes, or the volts over the amperes equal the ohms. Doubtless you are all very familiar with these terms, but I review them for fear some one is not, and I shall use them entirely hereafter to express these quantities.

Let us next consider the conditions in the patient as the current passes in through the medicine and tooth and out through the body at some more or less distant point. The amount of work done in a given case depends upon the amount of current flowing, and the amount of current is fixed by the pain limit. The former, is relatively a different quantity in different patients, and in different cavities of the same patient, and as a more or less remote point on the body is used from which to take the current. The average resistance through the patient for about twenty-five cases was about 25,000 ohms, varying all the way from

10,000 to 78,000 ohms, and in some cases even higher. The difference of resistance from the hand to the tooth and the cheek to the tooth is from 3,000 to 5,000 ohms. It is almost incredible the amount the resistance can be varied by the condition of the cavity. For example in a given case the resistance through the patient from the cavity which was barely moist, to hand, was 46,000 ohms. A forty per cent. solution of cocaine in water placed in the cavity reduced the total resistance to 25,500 ohms, and placing the pad on the cheek instead of the hand, reduced it to 23,800 ohms. These measurements are approximately accurate for they were made by standard instruments most of them from the source named above. This is only a fair sample of many cases I have the figures for here at this time.

Measurements of liquid resistances, such as the body, cannot be made with a Wheat-stone bridge as can solid substances, owing to a secondary induced current set up by the electrolysis of the fluid. They can best be calculated by Ohm's Law. For example, an accurate volt meter reading in tenths indicated a difference of potential across the patient of 5.7 volts and a milliammeter reading in hundredths of thousands of amperes indicated twenty hundred-thousandths, then the resistance of a patient would equal 5.7 over twenty one-hundred-thousandths, then the resistance of a patient would equal 5.7 over twenty hundred-thousandths, or 20,500 ohms. Ordinary commercial milliammeters that I have tried to use compared with the standard instruments would not register with any degree of accuracy through the first few degrees of the scale, the only part needed, nor would volt meters. The milliammeter used for most of these measurements could be adjusted to read in any fraction of an ampere from one thousandth to one millionth. The average resistance from the hand to the tongue with small electrodes is about 9,000 ohms, varying from 7,000 to 12,000, and from the cheek to the tongue, about 5,000 ohms, varying from 3,000 to 7,000. It will be seen at a glance that by far the greater part of the resistance of the patient is in the tooth, varying all the way from 1,000 ohms to 70,000 ; an average of probably near 20,000 ohms.

Measuring cavities at different stages during the excavating, with as nearly as possible the same conditions, shows a gradual decrease of the total resistance. In many cases many thousand ohms.

Time will not permit of many figures on the relative resistance of dentine taken from different parts of the same tooth, and from different teeth, and the variation of resistance of the same section of dentine, according as it is saturated with different solutions. For example a longitudinal section of fresh dentine almost dry on the surface, and five millimeters in thickness, had a resistance of 30,000 ohms, after dehydrating and saturating with a forty per cent. solution of cocaine the resistance was reduced to 4,500 ohms, and on again dehydrating and saturating with a sodium-chloride solution (common salt) the resistance was reduced to 3,070 ohms. The bearing of this on the process on cataphoresis will develop later.

Is the pain limit variable for a given cavity? Yes, though it is normally almost constant, except when medicated, in a case where there is no inflammation of the dentine or pulp, and where the patient's general nerve tone is constant.

Is there any *physical* difference in a *constant* and perfectly regular electric current of a given strength, however it may be produced? This is probably the most universal question in the minds of the members of our profession at this stage of the advancement of cataphoresis. No, there is not according to the opinions of all electrical authorities I have been able to find, provided the current be perfectly *constant* and of a given strength. This will seem a contradiction to the experience of many of you who have used currents derived from different sources, as it did to myself. We will try it in a few minutes.

The next may seem a greater contradiction to some of your experiences. Is there any difference in the physiological effect of a perfectly constant electric current however it may be produced? Provided the conditions remain the same and it is without variation. Ans. No. I mean by that, that a current of one ten-thousandth of an ampere produced by passing a current of four volts through 40,000 ohms resistance, say 25,000 ohms resistance in the patient, and 15,000 ohms resistance placed in the circuit, will cause identically the same amount of pain as a current produced by passing a current of eighteen volts through 180,000 ohms resistance, or a current produced by passing seventy-two volts through 720,000 ohms resistance, or a current produced by one hundred and eight volts through 1,080,000 ohms resistance, provided it is turned on in a way not to produce shock. I have done this frequently in

my practice as follows: The reflecting galvanometer was set to read two hundred and forty points to the milliampere. A current with a difference of potential between the poles of the batteries of six volts was allowed to pass through the patient and some resistance. The resistance was cut out very gradually until the patient felt a definite sensation of pain. At this point the milliammeter indicated 142 points or  $\frac{142}{240}$  ohms. This current was cut off carefully. Next, a current with a difference of potential between the poles of the battery of 18 volts was allowed to pass through a much higher resistance, and the patient instructed to give a signal when the same definite sensation was felt by reducing the resistance, which he did when the needle stood at just 142 points. This current was cut off and one of 21 volts through a higher resistance passed and the patient instructed to signal when the same definite sensation was produced by cutting out the resistance very gradually. He did so and the needle stood at just 142. This was stopped and 48 volts difference of potential passed through a higher resistance and the patient's signal was given when the needle was just at 142. Then a current of 108 volts adjusted in the same manner and the signal came when the needle was at just 142 points. I have done this frequently with myself and with a great many of my patients and have always gotten the same results, though some patients could not determine a definite sensation as accurately as others. I have sufficient apparatus here and will assist any of you to make the experiment upon yourself at the close of the session. If you try the experiment be sure to fasten the electrodes firmly in their respective positions and do not disturb them a particle throughout all the tests. I think I can demonstrate it so you all can see, with the reflex produced on this frog's leg. You see that by turning the current on very gradually so as not to produce the least sudden stimulation, there is actually no difference in the currents. This means, if all the conditions necessary have been covered, that any apparatus that will perfectly control the current is just as good as any other. But have all the conditions necessary been covered? No! I have here like resistance of the various substances used for that purpose, each with a total resistance of 45,800 ohms, and if the statement is true, that a current of definite strength is physically the same, it matters not how it is obtained, then the same electro-motive force passed through these different materials of equal resistance,

should give the same physiological effect. You put this electrode on your tongue and you cannot distinguish any difference in the sensation. The sensation of feeling seems to be identical with the indications presented in the reflex of this frog's leg. You can all see it and you can try the experiment on your own tongue afterwards. These resistances are German silver wire, water and graphite, and are connected alternately with this switch board for convenience, and you cannot detect any perceptible difference in the reflex of the frog or the sensation on your tongue by passing the current through one or another of these substances. This answers the question whether any one substance used as the medium of resistance produces any more or less pain than any other substance, *all the conditions remaining the same*. It certainly does not, although we hear so many assertions to the contrary.

Let us repeat what was asserted before, that a *perfectly regular and constant* current of definite strength will produce the same physiological effect under the same conditions, no matter how produced. If you apply two electrodes to your tongue it is a broken circuit, not a constant one; nor is an increasing or diminishing current a constant one. What difference does it make whether a current is constant or not: I wish you could each try the next experiment upon your own tongue, although this frog's leg reflex will demonstrate it. We will use as nearly as possible the same current strength in every case as indicated by this galvanometer. In the first case we will use a voltage of  $1\frac{1}{2}$  volts, and pass it through 3,840 ohms resistance. In the next, 18 volts through 45,000 ohms; and in the next 110 volts through 202,050 ohms. In each we will get a current strength of thirty-nine one-hundredths of a milliampere. With the first you see but a slight, though definite, reflex of the frog's leg; with the next, though identically the same amount of current, there is a decidedly greater and with the last, a still greater increase of the strength of the reflex. What is the explanation? Suppose you have three pumps so regulated with governors, that they will keep just thirty-nine barrels of water circulating per minute through each of three separate complete circuit systems of pipes. The first system has just enough miles of pipe so that the pressure that accumulates at the pump to force that amount of water around the circuit per minute is  $1\frac{1}{2}$  pounds to the square inch. In the second system, there are enough miles of pipe so that the pressure at the

pump as it sends out the water is 18 pounds to the square inch. In the third, there are just enough miles of pipe to produce a pressure of 110 pounds per square inch at the outgoing side of the pump in order to force the 39 barrels of water around the circuit per minute. Now suppose in the first a check of any kind is put anywhere in the circuit so that no water can get past, then the pressure will rise all the way along in the pipe as far as the check to  $1\frac{1}{2}$  pounds per square inch; that being the limit of the pump's pressure. Suppose a check is put in anywhere in system No. 2 and the pressure will rise all along that system to the check to 18 pounds per square inch. And so on with third system, the pressure all the way from the pump to the check would rise to 110 pounds per square inch. Let us suppose one pound to be the pressure required to force 39 barrels of water through one mile of pipe per minute; now suppose these checks were to be suddenly removed, what would be the strength of current for the first instant? In the first case it would be at the rate of  $1\frac{1}{2}$  times 39 barrels per minute, or  $58\frac{1}{2}$  barrels; in the second at the rate of 102 barrels per minute, and in the third at the rate of 4,200 barrels per minute. This would last for only an instant, and would immediately decrease until it reached its normal rate. The time this increased rate would last could hardly be calculated, but it exists and we have all observed it at the hydrant. This is precisely what occurs in the circuit of an electric current when it is broken. This produces what is called the throw of a needle of a current meter, some of which are constructed to not register this first impulse. The difference in the effect, according as the plug is near to or far from the pump, will come up later. Although there is such a difference in the reflex produced by these two currents by a sudden make or break, you will see there is no difference in the amount of work they will accomplish, for we will now connect them with these tubes of iodid of potassium and the amount of electrolysis is identical. If I turn these various currents on slowly enough, there is no perceptible difference in the reflex produced on this frog's leg, or the pain produced on the tongue or in a tooth. It is not necessary to break a current to get this effect for it takes place to a greater or less extent with every variation of potential, or of the total resistance of the circuit.

There are certain facts accompanying the process of catapho-

resis which materially determine the requirements of a satisfactory controller. First, the current strength cannot remain constant, it must be continually increased as the pain limit will admit, owing to the anesthetizing of the tooth. This is accomplished in two ways; either by increasing the voltage or by diminishing the resistance of the circuit. The former causes pain if done too rapidly or in too large quantities, and that in some cases as low as 1-20 of a volt; the latter produces pain if diminished too rapidly, or in too large quantities. Even if there is 50,000 ohms resistance in the circuit and the total is reduced by 100 ohms it will frequently produce pain. Another fact attending this operation is that the total total resistance of the circuit cannot be kept constant. Any movement of the electrodes, especially the one in the tooth, though ever so slight, may vary the total resistance of the circuit to almost any amount. No operator should attempt to hold the electrode in his hand, for it is impossible to prevent causing some variation in resistance of the circuit at that point. It is not necessary. Flexible, fine gold or platinum wire (which, by the way, dental depots would do well to furnish; about  $\frac{4}{1000}$  of an inch in diameter) packed into the cavity with cotton carrying the medicament will be infinitely more satisfactory, or any of the many excellent clamps for that purpose. In over three hundred cases, I have not required to hold it in a dozen. Special devices can be made in a couple of minutes for any special case. Another source of variation of the total resistance is from the cavity or the pad drying out, and when moistened, produce shock by a sudden increase of current, due to lowering the total resistance. It is absolutely impossible for us to keep a perfectly regular and constant current. We would not if we could, and we could not if we would.

Since the current cannot be kept constant, we should, for the least shock from variation, keep the total resistance in the circuit as low as possible. If using batteries with resistance in series, do not use any more cells than will do the work. For while if the current were to remain absolutely constant, there would be no difference in the pain produced, since that is clearly impossible and there must and will be variations, for the many reasons given, there will be more intense shocks caused by the same variation. If you get an apparatus in which the resistance is in series with the patient and batteries, be sure it is wired so you can turn on one cell at a time. I have had cases where 50,000 ohms resistance in series with one cell and the patient, produced unbearable pain

and the resistance had to be increased to 108,000. What would have been the effect if I could not use less than twelve or fifteen, or twenty cells in series, or a total variation of not less than 1,000 to 5,000 ohms, as some instruments have? An apparatus to be sufficient for all these extremely sensitive cases should, if resistance is put in series, have a total variation of not less than 100,000 ohms. Probably not over ten per cent. of cases will require over 70,000 nor over twenty-five per cent. over 40,000.

Let us next consider the other principle for controlling the current, viz: by means of a shunt. Suppose the resistance of **L P M** to be 15,000 ohms, which is of course the resistance of the patient, and the difference of potential between **L** and **M** is 110 volts, what must be the resistance of **L R M** to cause one milliampere of current to flow through **L P M**? It will require some introduced resistance at **L** or **M** to limit the amount of current within easy control. Let us say two lamps of 275 ohms resistance each. And according to the law of inverse proportions, the current flowing through **L P M** is the current flowing through **L R M** as the resistance of **L R M** is the resistance to **L P M**. The resistance of **L R M** approximately is 160 ohms. Suppose the resistance of a patient be 40,000 ohms, then the resistance of the other path **L R M** will be approximately 325 ohms. If **L P M** equal 10,000 ohms, then to give one milliampere **L R M** equals approximately 58 ohms. You will see at once that the amount of resistance placed in the shunt **L R M** is no indication of the amount of current flowing through **L P M**, unless you know the resistance of **L P M**. Hence, since the resistance of patients is such an uncertain and widely varying quantity, in different cavities, it is impossible to arrange any scale of indication of the actual amount of current any given case is getting. If the resistance of the patient was universally one ohm or any other definite quantity, or any approximate quantity, then an arbitrary scale could be just as approximately correct. Under the existing positively uncertain conditions, they have practically no definite significance. This includes the indicators of so called volt selecters. This problem of shunts is very complicated and I will dwell on it at greater length in my closing discussion (see page 96.)

What is the effect of making or breaking the current of one path of a two-way shunt? You get the actual true current strength as the first sensation. For example, suppose the resistance of a patient to be 20,000 ohms, and one-tenth of a milliampere is flowing

through the patient's circuit, L P M, then the difference of potential between the two sides of a patient would give the same amount of shock that he would from a cell giving two volts, when there was no resistance in series. If the resistance of a patient were 50,000 ohms, and one-twentieth of a milliampere of current was flowing, then the difference of potential across the patient would give the same shock as 10 volts in series and the patient would get the same shock he would from five cells in series giving two volts each. You see by this method the minimum possible shock is given, and since the variation is inevitable, in the current strength, this is a very important item. This is very easily demonstrated by the frog's leg reflex and felt by the tongue.

Now a word as to the capacity and necessary requirements of any controller to do all cases absolutely painlessly and thoroughly, which I believe is possible in 95 per cent. of cases. The instrument should be able to furnish a difference of potential across the patient of at least 20 volts, for actual measurement of cases show that some will finally and properly stand that amount of current. With an instrument taking the current from batteries with the resistance in series, this simply means that there be enough cells to produce that voltage, but if a shunt from a 110 volt circuit, it should have variable resistance in the shunt in proportion to the permanent resistance put in the circuit. If a shunt from batteries, the batteries should have a total voltage of 30 volts, and the cells should be arranged with a cell selector and high variable resistance. This is one objection to a shunt on cells. That a greater variable resistance is necessary owing to the lower potential, unless a very large number are used. It is not a practical objection however, since the alternative is very practicable. It is clearly evident that a shunt is the most satisfactory means of controlling the current by far, from the experiments we have made, no matter from whence the source of the current economy not considered. The economy of the cells is an important factor, and since a shunt of low resistance is simply a short circuit, the cells will not last so long as if less are used and a higher resistance in the shunt. What are the shortcomings and points of superiority of these different methods we have considered?

First. The water rheostat. If platinum electrodes are used in distilled water, and the total resistance is high enough, not less than 100,000 ohms, which means a column of about twelve inches, according to the size of the electrodes, and the mechanical working

of the machine is such that a perfectly smooth and easy control is had of the current. it is just as good as any using identically this same principle. The majority of this variety have not one quarter enough variation of resistance. Four inches of salt water would have less than 1,000 ohms resistance, according to size of electrodes, of lake or river water 5,000. Draw your own conclusion. The German silver resistance in the circuit in series, is efficient accordingly as it is finely divided into stops, or is sufficient in quantity, there should be 100,000 ohms, with steps of not less than 100 ohms for an ideal machine. It is probably as cleanly and durable as any. It is a fact, however, that the metallic contact connections, whether the points of a switch, or a brush or a coil, are not constant, and I have not seen an instrument in which they were a part that would not show a fluctuation of current caused by them, not enough to be an excluding objection if kept clean.

The objections to the metallic contact points in the green carbon stick are the above and that there is not possible a great enough total variation of resistance, and the contact points cannot be closely enough together to prevent shock, unless a very large board be used.

A system in which, as in Fig. 5, there is a very high resistance in the series in the 110 volt circuit, is not consistent, nor could its results be satisfactory. A difficulty with any form of lever to be moved by the hand over any carbon or graphite surface, is that the distance it can be moved without producing shock is too small, unless the instrument be larger than are generally used. Powdered carbon is extremely variable in its resistance. Where a third way shunt is provided, more variation is required in the variable shunt if its resistance is low. It is considered a guard against shock from variation of potential.

We have not referred to the automatic devices for increasing the potential or diminishing the resistance, all are good and are practical, many are very excellent but need constant attention, this point has not been appreciated by manufacturers in general.

What are the logical conclusions to draw from the foregoing experiments?

1. A method in which the principle of the device used for controlling the current is a shunt, is preferable to one where the resistance is put in series in the circuit.
2. Keep the total resistance of the circuit as low as possible.
3. Remember that the sensation produced by suddenly break-

ing the current is very similar to that of making it suddenly, not identical however.

4. If the 110 volt current is without variation of potential it is of almost equal efficiency with batteries as a source of current, if a shunt system is used, not so in series. It is not absolutely constant, however, in all cities, nor in all branches of mains where the mains themselves are fairly constant. In many cities the direction of the current is liable to be changed. Both of these are important items, the former would produce shock and the latter absolute failure, and I believe does very frequently.

5. Always keep just below the pain limit.

6. The fluctuations felt sometimes by patients are not always produced by current changes, they are sometimes physiological in origin.

7. After testing a dozen different varieties of instruments and recording over 300 cases, in which absolute failures were about 2 per cent.; partial failures about 8 per cent. and 30 pulps were drilled out absolutely painlessly, I conclude that some principles are inconsistent and the instruments using them failures, some all right in some cases, some excellent considering, but as yet none are just what the profession should demand and will some day get.

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## A Summary of My Experience with Cataphoresis.\*

BY L. L. BARBER, D.D.S., TOLEDO, O.

ABOUT six months ago I commenced to keep a record of cases operated upon with the different cataphoric apparatuses, with a view, if possible, of establishing some guide to its further utility in dentistry.

1st. What cases are most favorable to its use?

2nd. What kinds of medicaments were most efficient in its use?

3rd. What conditions were especially unfavorable to its use, etc.?

My record covers a little less than one hundred and fifty cases, and they have been so varied that without a correct record as to age, class of teeth, size of cavities, where located, susceptibil-

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\* Paper read at Ohio State Dental Society, Columbus, Dec., 1896.

ity of patient to electricity, the noting of fear from pain when able so to do, amount of time consumed for every case operated upon as compared to the approximated time it would have consumed without it, etc. I do not see how one could hope to arrive at anything like a true deduction as to whether cataphoresis is a benefit to him in the broad sense of the term or not. To me the keeping of a record has proven very instructive as well as interesting, and may prove so to some of those who are contemplating the use of some of the many cataphoric appliances upon the market.

It is probably a fact that many of the apparatuses made for the purpose will transfer medicaments to deep seated tissues. There is a difference, however, in the amount of pain produced by some over others, even with the same amount of current and at the same pressure. It is very necessary that the operator have perfect control over the current. Just how that is to be done I will let the electricians settle. However, I have found the current with some apparatuses very much more under control than with others.

Some patients are so sensitive to electricity that it is almost impossible to get enough current to carry the anesthetic into the dentine without producing more pain than the patient cares to stand, even with the most sensitively controlled instrument. I have found some such cases for which I could find no other reason than these persons' natural susceptibility to the electrical current. On the other hand many cases will be found which to the beginner might appear to be in the same class, but which, when better understood, can be attributed to various other causes, among which my record of cases show the following:

First, persons who are frightened. I have quite a number of cases on record where one, two and in one case as many as three attempts were made at different sittings before the patient could be brought to an understanding of the difference between the cold and slight prickling sensation attending the application of an electrical current, and pain. One case upon which the third unsuccessful trial was made now will not have a tooth filled without. I have attached a report of this case. This case was a boy of eleven years. I think he did not experience anything but fear the first three times. One of the other very bad cases was not fear, for I found the person could feel my pulse, so to speak, so

susceptible was she to electricity. I fastened the anode to the clamp upon the tooth, and that trouble was over. Another trouble I had when using the 110 volt current, was every now and again I thought the patient was going out of the fifth story window. Finally I discovered that just before they were about to take their departure they would take hold of the iron bracket arm, or some metal part of the chair, and so form a ground. That was something I was pleased to be able to avoid in future. Even with a dry cell battery you may find this same trouble, being due, as I believe to some imperfection in some one or more of the cells. It is better to have each cell tried separately before connecting up, and thus be on the safe side.

Deductions show that very hard teeth are more tedious to control, and very much more time is required to produce the desired results, owing to the fact of there being less animal matter, therefore more resistance, and unless you are very careful you will put on pressure, or rather voltage enough to produce pain by heat. Therefore keep the cavity wet (not the whole tooth), and do not try to get good results in a case of this kind as quickly as in a soft tooth.

Large labial cavities, according to the records kept, show, possibly, a larger per cent of satisfaction than any other class. Those large, extremely painful, and exceedingly difficult labial cavities in the incisors and cuspids, have been in my hands very satisfactory. However, in almost all classes of cases where the cavity was accessible and the condition of the pulp nearly normal, the work has been quite satisfactory.

Anesthetic solutions that have been used by the writer include hydrochlorate of cocaine in various strengths, from 4 per cent. up to 30, 50 and even 75 per cent. Guaiacol, which is one of the phenols, is not as escharotic as is creosote, of which it is an extract. But experiments tend to show that guaiacol has a coagulating action, and therefore does not permit of all the anesthetic properties of cocaine being brought out. By the use of most of the solutions of cocaine I have failed to get the phenomenal results that some have claimed.

Eucain was used in quite a number of cases. I do not think, however, that better results were reached, except the anesthesia produced proved to be more prolonged, if that could be claimed an advantage.

The solution with which the most satisfactory results have been obtained according to the record kept in my office is a 30 per cent. alcoholic solution of cocaine, or rather cocaine is soluble one in three and one-half parts.

In looking over the records I find cases covering youth, manhood, and old age, male, female, persons who were very susceptible to electricity and those who were vice versa, persons who were scared almost to death, and those who were not frightened at all, persons upon whom it worked charmingly, and those upon whom it did not work at all, except in a way one did not desire to have it. But the alcoholic solution of which I have spoken shows the best record.

The cases recorded substantiate the therapeutic axiom that the degree of reaction is proportionate to the degree of vitality, the greater the vitality the greater the reaction. Hence, any departure from the normal would retard the action of the cocaine solution used. So that in a general way it may be said that any condition of the pulp that lowers the physiological tone of it, will retard, not only the absorption of the cocaine, but also make the tubule fibrils and pulps harder to anesthetize. Cocaine is a nerve paralyzant when brought in contact with it and then only. So that when used in a tooth without a nerve exposure we can hope for the anesthetic effect only by the current carrying it through the tubuli. So the ideal result will be less in proportion to the amount of lowering of the physiological tone of the fibrils.

My records show that dentine is anesthetized primarily over the radius covered by the positive pole, because the current passes in the course of least resistance toward the apex of root through the tubuli and pulp canal. Thus the larger surface covered by the positive pole the greater will be the surface obtunded. It is only secondarily that all of the dentine can be obtunded, but one can, by using a disk of metal over the saturated cotton, and then placing the platinum point upon the disk, get a larger current covered surface, and thus better results. I hope and believe that there will soon be a better preparation for use in connection with the electrical current.

We may expect the effect of drugs introduced into the dentine to be more lasting, owing to the absence of active fluid circulation there than in soft tissues.

Since writing the above I have had two cases I want to mention. One a boy of 12 years, distal cavity in right superior central incisor and mesial approximate superior right lateral incisor. Both were extremely sensitive, by fitting a piece of platinum wire extending into each cavity and ten minutes application of current reaching 20 volts. I was able to prepare both cavities with perfect comfort to the patient, and mind this was not a case of "Cure worse than disease," for there was (according to the boy) not the least pain during the process of obtunding.

The other case was a man 40 years of age, practiced law for some years, had nervous prostration, left his profession but has never fully regained control of his trouble. Most of the teeth he has lost has been on account of their extreme sensitiveness, and his inability to stand the nervous shock of filling, not on account of anything else. Nov. 25th I operated upon the right second lower molar, it having a posterior approximal cavity, very much under gum, but not extending to occluding surface. It also had a shallow but large buccal cavity mostly under the gum. It was impossible for me to prepare those cavities, so sensitive were they, and I could not get at cavities to apply cocaine with the current, and I drilled a small hole into the occluding surface, and applied cocaine and current, and in twenty-one minutes was able to clean both cavities painlessly. The gentleman said it was entirely satisfactory during the application and excavation.

### Some Reasons Why We Fail With Cataphoresis.\*

BY W. H. HERSH, D.D.S., PIQUA, OHIO.

THERE has been no subject during the past year that has received so much study, experimenting with, writing upon and discussing, as the one commonly known as "Cataphoresis." No one theme has received so much time in our various societies or been given as much space in our dental periodicals, or excited such universal interest among the members of our profession as the one to which we have just referred.

It shows conclusively that the dentist has been looking for-

\*Read before the Ohio State Dental Society, Columbus, December, 1896.

ward with no small degree of anxiety to the time when he should have an *ideal* obtundent, and anything that promises this is welcomed by all.

The first paper written upon this subject, during the present year, was prepared by a man who had carefully tested the merits of the method, and had apparatus especially made for the control of the current; one who had given up breadth of subject in order to gain depth; whose energies were all directed in the line of the relief of sensitive dentine by electrical osmosis. And when the results of this careful and skillful dentist, who had spent many months in this single branch of dental electro-therapeutics, were made known, we were led to believe that it was an *easy* method and very closely and probably fully met that desire for the ideal obtundent for which we have been so long seeking. It was the kindling of the fire which has swept over the entire dental world.

My love for this peculiar power or energy led me early to test, investigate and experiment with this process, and with various appliances and combinations, until I am now satisfied that there is much to be done yet before it will fully meet our wants, and have found, as every one else has found having experience along this line, that it is *not* the panacea for all dental ills, and so shall try and give "some reasons why we fail with cataphoresis," stating first that it is an established method and one in which the possibilities seem practically unlimited.

First and foremost, is the reason that the average dentist himself is not prepared for this class of work. A physician who is skilled in the use of electricity as a remedial agent gives this advice to those who contemplate the use of electricity in their practice:

First, make yourself a skilled physician, then study the physics, physiology, mechanics and chemistry of electricity, seek practical instruction in the technique of applying the same, then buy your outfit.

How reversely true is that of the dentist who wishes to use electricity as a therapeutic agent, or wishes to use it to cause deeper penetration of other agents. Does he not first buy his outfit, then seek instruction in the technique of applying it from a circular of a few pages? If success attends his efforts, will probably look deeper into the subject; but if not successful,

abandons the apparatus and method and calls them worthless, when he himself is the worthless part of the outfit. It is puzzling to me that men should even *expect* success when handling an agent they know so little about, in many instances being doubtful that there is any virtue in the method, possibly not knowing that plus + stands for positive, or minus — negative, or what the difference between the two is, having but little idea or what the simpler terms mean, or the action of the current in any but its most common forms. Is it then but reasonable to believe that a method that requires such skill in handling and such nicety of adjustment, in order to be a success, should be a *failure* in the hands of careless operators, or those not understanding their apparatus thoroughly, or what is going on between the two electrodes. And so it seems fitting to put the operator *first* in the reasons why we fail with cataphoresis, believing that a better general knowledge of the elementary principles of galvanism will be necessary before the method can become the universal obtundent.

The next reason in importance as to why we fail, is the source of the current supply, and, in fact, it seems almost as necessary that we have a smooth, even current as that we have a skilled operator to apply it. No doubt among the better class of operators no one factor has played such an important part in their failures as an irregular and unreliable current, excepting, as a matter of course, inferior apparatus.

Let me first say that, in my opinion, the 110 volt commercial current should *never* be used in cataphoric procedures. This statement is not made on any theoretical grounds, but by actual and persistent experience in the use of the 110 volt current in this work.

We found first that it was *not* the current for use in the relief of sensitive dentine, and so discarded it for that, using cells, but retained it still for bleaching and the other work; in fact, everything except the obtunding of sensitive dentine, but later on have discarded it, giving cells the preference even in this class of work. My reasons for making the statement that it should never be used is based on several factors, viz.: First, because it is a *dangerous* current to use in this extremely sensitive and delicate work. Dangerous because of a possible ground through the fountain spittoon, an experience which your humble servant has

had, and one which he will never take the risk of having repeated; dangerous because of atmospheric electricity or lightning coming in contact with your mains; dangerous because of wires carrying powerful currents coming in contact with the system; dangerous because of the possibilities of having a lamp burn out or broken, or a connection to become loose and many other things which might cause it to prove disastrous, makes it a current that we should not accept the risks of using in this work about the head, *especially* when a satisfactory current can be so cheaply obtained from a few dry cells, and one which will answer every purpose, and require no care on the part of the operator.

Second, because in the majority of cities the current fluctuates and is too irregular to be used in this work. The sudden raising or lowering of the voltage, which is unavoidable in most plants, will cause pain and failure.

Third, because, when we have put resistance enough in the path of the current to reduce it so we can use it, we have a current of high electro-motive force, but with very little volume, while with the cell we have just the opposite condition of affairs. To verify this statement we will give you two tests made that will more clearly bring this fact out, viz.: three mesco dry cells in series gave 4 3-10 volts. The 110 volt current was then shunted until we had as a maximum voltage 8 volts and reduced to 4 3-10 volts by a graphite resistance, on short circuit we found the 110 volt current to give as its maximum strength 8-10 of a M. A., while the three cells gave 5 1-2 amperes, or 5,500 M. A., the 110 volt less than 1 M. A., and the cells 5.500 M. A. Second test was 6 mesco cells in series gave 8 1-3 volts and 5 1-2 amperes, or 5,500 M. A. while the 110 volt shunted to 16 volts and reduced by the graphite rheostat gave 6 8-10 M. A.

We would not have you understand by this that a certain voltage generated by cells has more power to overcome resistance than the same number of volts derived from any other source, even though the amperage or volume be made larger, but this fact I would have you note: that resistance reduces the amperage or volume much faster than it does the voltage or electro-motive force, and further that men in the medical profession who are intimately acquainted with the physical laws of electricity, as well as those having years of experience in the use of electricity in the treatment of disease, have found that the least number of

cells that would furnish the desired amount of current without the intervention of a rheostat or external resistance of *any* kind, will produce the same results in the same time and with *less* pain than can be done with a larger number of cells and the voltage reduced by means of the rheostat. That being true in medicine, it must be true in dentistry.

Fourth, because when the current is smooth and the voltage steady and even, we have a current which is not any *superior* to the cell, but to me very much *inferior*, because of the attending dangers and the extra caution necessary in handling it. The cell is such an inexpensive thing that this can scarcely be urged as against it, and there is such a small quantity used from it, it will no doubt do service for many months, and will be found to be just as efficient in the office of the country practitioner as in the splendidly equipped parlors of our city brothers.

Another reason that may cause failure, is because of too small negative surface. This fact must be remembered, that the *larger* the negative electrode, the *less* the resistance, as the tooth operated upon and the skin form the major part of the resistance, and if too small an electrode is used, it causes a burning or prickling sensation, and I have noticed in many cases a deep reddening of the skin, even though a very small amount of current was used. It also requires more current or voltage to get the same results, and therefore is more painful, which causes the patient to lose confidence, and you stop short of success, while a liberal negative surface would materially lessen the resistance; therefore, require less electro-motive force and less pain to get same results. A single experiment will serve to illustrate this. Three cells, using a negative electrode  $1\frac{1}{2}$  in. in diameter and well moistened, gave us  $\frac{3}{10}$  of a M. A., while a large negative sponge electrode gave, with the same number of cells and through the same resistance,  $\frac{7}{10}$  of a M. A., which was more than double that of the first.

Another reason why our operations are not more uniformly successful, is because of the lack of proper measuring instruments. It seems as if uniform results could hardly be expected in the administration of the current, unless we knew just the amount of current that is actually passing through the tooth or soft tissues of the patient. It is my firm conviction that no one ought to administer the current to a patient without knowing

precisely the amount being used. True it is, that we can get along without, but it is the *best* way to do, and should we be hindered in any way by not having everything needed to give the best results?

Another thing that is the cause of much pain, annoyance and failure, is the mistake many operators make by trying to hold the positive electrode in the tooth. This should be avoided whenever possible, as the least movement of the point in the tooth causes pain, which sometimes makes the patient nervous and fretful, and you and the patient are both willing to quit before any deep obtunding effects are secured. A very convenient way to hold the electrode is to solder a piece of fine platinum wire onto the tip of the conducting cord, and fusing a little ball on the point with the electric current, so that when placed in the cavity and cotton packed around it, it will be retained in position, and thus save the operator the trouble and fatigue of holding it. The wire can be insulated by a small piece of fine regulating tubing. The time required in some cases which most need this method is a barrier to success that cannot be lost sight of. The preparation of the cavity before commencing is a very important item, and the thorough insulation of the tooth and fillings is certainly one of the very necessary things to do, and if close attention is not given to this it will cause you to have a failure, where otherwise you would be successful. Many other things might cause failure, such as loose connection, inferior cords, corroded surfaces, stale solutions, inferior apparatus, and many small things in detail, which only experience can teach.

Please bear with me while we administer, we hope cataphoretically, a few words of advice. First, study some of the elementary principles of Galvanism, buy your outfit of a person or company who has thoroughly tested it and proved it to be reliable, then for your first cases select some of the patients that you would dearly love to see leave you, and commence to use the cataphoric method, reserving the patients you care to keep until sufficient experience and confidence is gained to make it a practical obtundant; use a good apparatus, large negative electrodes, fresh solutions, and some judgment mixed in with the rest, and you will find in a little time that you have an obtundent which will make possible thorough operations, where before it was necessary to make temporary fillings, and your patients will

thank you for your skill in handling this agent, and all the while you will be gaining experience and mastery over a process which promises a wider range of usefulness than any method brought to the notice of our profession during the last decade.

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### The Galvanic Cell.\*

BY H. G. HUSTED, OBERLIN, O.

It is my object in this paper to give a description of the galvanic cell, its construction, action, and its practical application to dentistry. It is very evident that electricity is to take a prominent place in the operating room and laboratory of the up to date dentist. What has been accomplished in the past few months is, in my mind, but the beginning of still greater results to follow; and these greater results are to be brought about by each one who has any information to give upon the subject, although it may be but little, freely contributing to the general fund.

Galvanism is that form of electricity which is generated by chemical action. The galvanic cell is a development of the voltaic pile, which as originally constructed consists of pairs of zinc and copper plates, between which, pieces of blotting-paper or flannel moistened with an acid or saline solution are placed, from which an action is set up; its strength is proportional to the number of pairs used; the current is the result of the action of the acid upon the zinc plates.

The most familiar form of the galvanic cell, consists of a vessel containing dilute sulphuric acid, or a solution of sal ammoniac, in which a plate of zinc and a plate of carbon are partially immersed, the carbon surface being much greater than that of the zinc.

If the zinc is pure, there is no action as long as there is no external connection between the two; but if they are connected together by a wire, the acid attacks the zinc and electricity is generated, which passes through the fluid to the carbon within the cell, and from the carbon to the zinc over the wire outside the cell.

The question may be asked, what is this thing which manifests itself in such a wonderful manner?

\* Paper read at Ohio State Dental Society, Columbus, Dec., 1896.

An expert says "It is a question no man can answer." One definition given is, "The name given to the unknown thing, matter or force, or both, which is the cause of electrical phenomenon."

The street car motor-man who calls it "juice" understands its real nature as well as the wisest expert.

There are many substances which may be used besides zinc and carbon; whatever combination is used, one of them must be more readily acted upon by the acid than the other. The generating plate will show loss by dissolution while the collecting plate will show little or no loss.

The plates are also called positive and negative; the carbon being the positive from the fact that the electric current outside the cell first manifests itself at that point and passes to the zinc; (there is no variation of this order when these elements are used.) There are conditions when this may appear to be untrue. Our battery fluid is all right, the zinc and carbon properly connected, and yet there is no current; the battery has become polarized. When the battery is in action there is a decomposition of the water into its elements, oxygen and hydrogen. These gases show polarity the same as metals, oxygen being negative and hydrogen positive.

We are speaking now of the action within the cell and must consider the zinc as positive and the carbon as negative. The negative oxygen is attracted to the electro positive zinc and unites with it, forming the oxide of zinc; the positive hydrogen collects on the electro-negative carbon; there being no action between them, the hydrogen bubbles remain upon and cover the surface of the carbon. The battery fluid attacks hydrogen more readily than the zinc, and the latter becomes the collecting plate, thus reversing the current; this goes on as long as there are hydrogen bubbles upon the carbon; these may be removed by simply opening the current or raising the carbon out of the fluid for an instant.

Impurities in the zinc, such as particles of iron or arsenic will also interfere with the action of the battery, causing a local action upon the zinc. This is avoided by having the zinc coated with a film of quicksilver.

Any substance over which a current of electricity passes freely, is said to be a good conductor; copper being such, is commonly used for this purpose. The larger the conductor the

greater the amount of current will pass over it in a given time. The conductivity of any conductor depends upon the area of a cross section. The opposite of conduction is resistance. By reducing the size of a conductor the amount of current will be correspondingly reduced.

That property by which electricity is enabled to overcome resistance is called electro-motive force, the unit of measurement being the volt.

The electro-motive force of a cell is not determined by the size of the cell. A cell the size of a common tumbler will have the same electro-motive force as one the size of a bucket, when composed of the same elements.

Zinc and carbon are commonly used because of the great difference of electric level or potential which they furnish.

The electro-motive force of a battery may be increased by increasing the number of cells. The quantity of current produced by a cell depends upon the size of the generating plate; a cell having a generating surface of one hundred square inches, will give five times as great a current as one with twenty square inches, because there will be five times as great a consumption of zinc.

The quantity of current may also be increased by increasing the number of cells. The unit of measurement of quantity is the amperes.

We now come to that part of the subject which to me is intensely interesting, the quantity arrangement and the potential arrangement of cells.

There are certain purposes for which a current of large quantity is required, such as producing cautery and other heating purposes. It has already been shown that the quantity depends upon the surface of zinc exposed to the action of the fluid.

A cell with a zinc plate 4x5 inches would have a surface of 40 square inches; if much larger, the cells would be cumbersome, especially if a surface of 200 square inches was required; but five cells whose aggregate surface would be 200 square inches could be joined in such a manner that the same result would be produced. By joining the zincs in all the cells together, and the carbons together, we would have the same amount of surface acted upon by the fluid, and the same amount of zinc consumed as in the one large cell, and the quantity of the current would be the same.

The electro motive force is the same in the small cell as in the large one, and when the five cells are connected in this manner, the electro-motive force will remain the same as in one cell, about one and one-half volts.

In connecting for potential there is no advantage in having large cells, in fact the smaller the better, within certain limits. Let us take the same five small cells and connect the zinc of the first cell with the carbon of the second, and the zinc of the second with the carbon of the third, etc.; we will then have the carbon of the first cell and the zinc of the last cell free, to these we connect our terminal wires,—what is the result? We have a current with an electro-motive force five times as great as in the former combination. Each cell added raises the potential of the series, and the electro-motive force is increased as many fold as there are cells in the series.

The resistance of the human body is very great, and it is the electro-motive force of the current that overcomes that resistance. Ten large cells will not send a greater current through the body than an equal number of small cells of like construction. For \*anaphoric purposes, the number of cells needed varies greatly, from six to ten cells being sufficient in the majority of cases, when under proper control.

The dry cell in common use, has the same elements, zinc and carbon, as described, but the exciting agent is prepared in the form of paste and the cell is sealed up. This makes a very convenient form for our use, as the battery can be kept within a very small compass. These cells are intended for use only where there is considerable resistance, or the time they are in use is short. They are soon exhausted if left long at a time with closed circuit.

Ohm's law, which is the foundation of all electrical measurements, is as follows: "The strength of the current passing through any part of the circuit varies directly as the difference of the potential between the elements, and inversely as the resistance in the circuit itself." The formula of Ohm's law is that the current equals the electro-motive force divided by the resistance. ( $C = \frac{E}{R}$ ).

We now come to a practical application of the galvanic cell

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The anesthetic effect being produced at the anode, anaphoric seems to the writer the more proper word to use.

in relieving the pain when preparing cavities in the teeth for filling.

I do not propose to speak of what has been accomplished within the past year because you are all as well, or better informed upon the subject than I am. I propose rather to give you somewhat in detail an account of what I have been trying to do, and some of the results.

Three years ago a friend who was somewhat interested in the subject of electricity asked the privilege of using a back room in my office for experimental purposes; his apparatus was somewhat crude, consisting of a half dozen copper cans about six inches square and three inches deep, some small flower pots for porous cups, and common sheet zinc for plates. I had no knowledge whatever of the subject, but I watched him with considerable interest, although nothing whatever resulted from his work, which was soon abandoned—all his cans, etc., being left where he used them; the copper sulphate running over the edges of the cans and on the floor making considerable of a muss.

Later in the winter I spent a little time occasionally in trying my hand at it; my object being to obtain current that would run a small motor. My outfit consisted of the copper cans which my friend had left, which were partly filled with the copper sulphate solution, into which I suspended sheets of zinc; the result was a violent local action and very small external current.

In January or February, 1894, I had a lady patient who wished me to fill a cavity in the superior left lateral incisor, labial surface. Upon attempting to excavate the cavity after adjusting the dam, I found it so sensitive that it was impossible to proceed. After trying all the remedies I could think of without any good effect, I determined to try electricity, such as I had. I think now that I must have had the cells connected two in series and three in parallel, which would have given an electro-motive force of about three volts; I connected one wire to a piece of tin and applied to the side of the face,—the other was adjusted to cervical clamp on the tooth; there was no sensation experienced from the current, but I could use the engine burr or excavator without a particle of pain to the patient. To make sure that there was no make-believe on her part, without her knowledge of what I was about to do, I several times disconnected the wire from the clamp; in every instance the pain of excavating was

as great as at the first. Upon connecting again it was perfectly insensible to any amount of cutting. This gave me the assurance that electricity rightly applied would do the work. Subsequent trials were more or less successful, but none equal to the first: I had no way of testing the current, and in fact I had little idea of the nature of the current used.

I began to study the problem but could get no light from any source. I tried various kinds of batteries, (such as I could construct myself) large and small, few and many cells, connected up in all manner of combinations, but with little success. I next turned my attention to the subject of resistance, and constructed rheostats of various kinds. Not having any appliances for measuring a current, it was impossible to do any accurate work. A few dollars invested in a McIntosh milliamperemeter and a work on Electro-Therapeutics proved to be a good investment. In the chapter on the Production of Cutaneous Anesthesia, in which the action of cocaine with the galvanic current, was described, I made this note on the margin, "Try on tooth." But being more interested in finding the action of a direct current, I did not push my investigation in that direction.

When the success of the electro-cocain process was announced a year ago, the appliance which I already had was adaptable to that purpose, and excellent results were accomplished from the first.

The chief objection to anaphoresis then, as now, was that too much time was required in the operation. If it were impossible to accomplish the same result in some other way, this objection ought not to be a valid one. The operator who is unwilling to take a few minutes extra time in order to avoid actual suffering on the part of his patient, is not worthy of that patient's patronage.

What is the physiological effect of a galvanic current upon a nerve?

One writer says that a current traversing a certain length of nerve, divides it into two sections or zones which physiologically differ. That portion nearest the negative pole has its irritability increased, and its condition is called catelectrotonus. That portion near the positive pole has its irritability decreased, and its condition is called anelectrotonus: and that point of difference between these two conditions depends upon,

- 1st. The size of the electrodes.
- 2d. Distance they are apart.
- 3d. The electro-motive force of the current.
- 4th. The length of time the application is continued.

This principal can be successfully applied in the case of ordinary tooth-ache from an exposed nerve, by using a mild current for a few minutes.

I have used the galvanic battery in cases of soreness of the face or threatened suppuration with good results, the negative pole being applied to the sore portion with a large electrode, and positive held in the hand, using as strong a current as possible without causing pain, for fifteen or twenty minutes, repeated two or three times.

There are certain conditions which it is necessary to observe in attempting the electrotonic method: 1st. The current used must not be so great as to cause pain of itself. 2d. The engine burr must be fine cut and sharp. 3d. The pressure must be light and the engine run rapidly. The full strength of one and sometimes two cells may be used without the patient feeling any unpleasant sensation. Then again a quantity of resistance must be introduced into the circuit from one cell in order to make it so the patient will not feel it. The amount of current required will vary in different teeth of the same individual. In case the cavity is shallow, the caries not having advanced very far, a greater amount will usually be required than where the tooth structure is badly broken down. Yet no set of rules will apply in all cases. One must learn from experience about what is needed and then try until he obtains the best results. I have often tested the current used on the milliamperes meter and have found it to vary from one-tenth to four or five milliamperes, sometimes, sometimes even more, under a pressure of from one and a half to four and a half volts.

In cases where the cavities are located on the labial surface of the incisor teeth, adjust the dam, using a cervical clamp. Place the negative electrode on the side of the face as in anaphoresis, and attach the positive electrode to the clamp as previously described. This will allow the use of other instruments besides the engine. Or the positive electrode may be attached to some point on the engine so that there will be a metallic circuit to the burr. Special pains must be taken to avoid making a cir-

cuit through the operator. The safer way is to have the hand piece insulated with thin rubber tubing.

Until the electrotonic method has become more fully developed, a large per cent of cases may prove partial or total failures, but if one has an appliance which can be adapted to either method, it is but the work of a moment to shift the positive electrode from the engine to the tooth and use the electro-cocain process.

When we learn how to control the direct current so that it can be successfully used in the major part of our operations, we shall have made a great advance over anaphoresis.

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### Discussion on Cataphoresis.

[Discussion of papers by Drs. Price, Barber, Hersh, and Husted, Ohio State Dental Society, December, 1896.\*]

DR. L. E. CUSTER, Dayton: We have in these four papers, had more good matter on cataphoresis presented than I have heard in any society either east or west.

Dr. Husted has presented a paper somewhat elementary in character, but nevertheless what is needed for us as busy dentists. The applications of electricity in dentistry are becoming so numerous that the time is at hand when we must give a little attention to electricity.

The illustration of the meaning of the volt and the ampere is good. In the arrangement for quantity of current in amperes we may consider the vessel as lying upon its side. The pressure of the water is not very much, but a large quantity of water would flow out if a side were removed. If the vessel be stood on end and the water allowed to escape at the lower end, then there is not so much water escaping, but the pressure is increased. This would represent the volt in electricity. The *ampere* is the current and the *volt* is the pressure.

Now, in this illustration, about the same amount of work will be done by this water in escaping, whether the vessel is laid on its side or stood on end. This is represented in electricity by the term *watt*. The product of the volts multiplied by the amperes and 746 watts make one horse power.

In referring to the peculiar (?) current, once obtained by the

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\* These papers appear in the current issue OHIO DENTAL JOURNAL.

author of the paper for sensitive dentine, it seems strange that it cannot be reproduced, and it seems to me I would not stop till it was, because that is the ideal we have long sought. The method of a gentleman from the northern part of our State savors somewhat of quackery. It has been ascertained that the method of obtunding dentine, if it may be called such, with the galvanic current alone, is not a success.

Dr. Hersh is correct when he states that dentists are not electricians. This process of cataphoresis requires more breadth of knowledge than any process in dentistry. It requires not only a knowledge of the ordinary operations of electricity, but a careful study of the principle under which it operates, and the conditions necessary for a successful application. We must know something of electrolysis and resistance, and the control of our current. I have favored the use of the 110 volt Edison current, because in my own city it is quite satisfactory. I get my current direct from the main line and am not annoyed by any great fluctuation in voltage, which it has been my experience to meet with while operating in other cities. It has some dangers and faults, but gradually we are finding them out. Only a short time ago I could not account for a sudden shock to a patient, but upon examination I found that she had touched the iron-work of the chair, which made a "ground" through the water flowing in the rubber tube of the fountain cuspidor.

In operating with the Edison 110 volt current, in various portions of the country, I have noticed that there was a great variation in the currents in different places. In some there was so much pain in the application of the current that the operation could not be called a success as far as being painless was concerned. When the appliances were perfectly quiet the patient would from time to time experience sudden and severe shocks of pain, much as if the current had been broken. I feel safe in saying that in these instances, where there was intermittent pain to the patient, and the electrode was being held quiet, it was due to the fluctuation in the main current. The fluctuation is usually a lowering of the voltage, and so quickly done that it is not noticeable on the ordinary volt meters in use. It is not a drop of a few volts only, but quite a number; at times perhaps twenty or thirty.

Dr. Molyneaux cited a case where he thought there was a short circuit produced by two outer wires coming in contact. If this really occurred, it would raise the voltage only three or four

volts, yet that would be enough to give the patient a shock. When one is using a shunt, however, there is not the danger that there is from using a series current, even if it is the Edison. The current obtained directly from the wire passing the building is the most constant and satisfactory. A cataphoric appliance, operated from the same wires that supply elevators or machinery, or where they supply many lights, is not very satisfactory, because when any one of these is cut in or out, it varies the voltage used for cataphoresis.

There is one thing in favor of storage batteries and that is that they are active. The elements are always ready for an opportunity to combine and you are sure of a constant current. The dry cell battery seems to warm up for a time and then lets down.

In regard to electrodes, the negative should be of sufficient size not to cause a blister under it. If it be large there will be less reddening of the tissues. One of the principal points of success in cataphoresis is that the positive electrodes must be held quiet.

In the treatment of proximal cavities, I make a sort of hook of platinum wire and hang it between the cavities to be operated upon, and pack the saturated cotton about it.

The poles should be placed as near together as possible, for by so doing you get less pain when applying the current, because less voltage is required.

I would advise all dentists who are using cataphoresis for the first time, to take some simple cavity where all walls are visible, and in some location easy of access.

Dr. Barber began his paper by stating that there was a difference in the susceptibility of patients to the electric current. This, I believe, is in a measure correct; at least, I find that under similar conditions some patients will feel the current more than others. But in cataphoresis we use so little current that I am inclined to the belief that it is not all due to the peculiar electric pain. It is probably the same thing that we observe every day: some patients seem indifferent to the cutting of the same kind of dentine that may be excruciating to others.

In regard to the percentage of solution, I have always held that it is cocaine that we are trying to project into the tooth, and if our solution is all water that is what we will have and nothing else; but if it is cocaine and a saturated solution, we will then drive cocaine into the dentine. There have been so many solutions of various percentages presented that you will probably comply with somebody's formulæ, whatever per cent. you use. The cavity

should be kept well flooded, for two reasons—one, that there will not be a waste of energy, and the other that there will not be a shock by the variation of resistance in the half-moistened cotton.

I have found no virtue in guaia-cocain over pure cocaine, and the odor of the former is a decided objection. It is also a poor conductor as compared with pure cocaine.

The essayist was correct in stating that the current flows through the tubuli of the dentine. You will get anesthesia only where the mouths of the tubuli are exposed in the cavity, unless the process is carried far enough to penetrate the pulp, and anesthetize that and the dentine whose tubuli are covered with enamel will be anesthetized reflexly. In the case of the molar, the dentine of the buccal cavity was anesthetized after the pulp had been affected through the exposed dentine in the crown.

The paper of Dr. Price is one of the best yet presented on cataphoresis, and although it is scientific and somewhat technical, it is presented in such a way that it is within the understanding of all. When it appears in print everyone should study it carefully and use it for future reference. The objection to the water and all forms of series rheostats is well taken, for there are serious objections to their use in cataphoresis. We have here had a clear illustration of the direct and shunt current, and also an explanation of the deceptive term "volt selector." A volt selector is simply an instrument which gives a shunt current for cataphoric and other purposes. It is convenient because it can start with zero and increase in voltage at will, by simply shunting or switching a little of the main current on a side track. In England the railroad switch is called a shunt. It is safer, because the patient is not in the main current. I have had something to do with the making of cataphoric appliances, and in making one for the 110 volt current, I put in a third shunt-coil, simply as a matter of safety, and in so doing I noticed that there was less shock to the patient than where this coil was left out, and so have continued to use it. Dr. Price has told you why this is so.

I stated before the Mississippi Valley Society that the best position for the negative electrode was on the cheek or as near the positive pole as was practical. I had so especial reason for that, except that it required a higher voltage to do the same work when the cathode was held in the hand than when held on the cheek, and the lower the voltage the less would be the pain. Dr. Price has illustrated that very nicely.

When we make measurements of voltage and amperage in dentine cataphoresis, we must bear in mind that the resistance of the dentine is the greatest in the course of the current from the positive to the negative. (Of course enamel is not considered, because it is a non-conductor). For this reason the area of exposed dentine and the distance to the pulp are the principal factors to be considered in the measurement of current. Abraded dentine will probably offer very high resistance as compared with freshly exposed dentine.

Some of the appliances for use with battery are series instruments, and in order to increase the voltage it is often necessary to go back and throw in additional cells. This is a loss of time as well as a more painful way. It requires about one-eighth more cells to give a shunt current instead of a series current ordinarily. The cost of this extra amount fully repays, because it saves time; it enables the current to increase from zero, and being a shunt current is less painful.

DR. J. R. BELL, Cleveland: In my practice I have found it necessary to make a few preparatory steps before using cataphoresis on my patients. The first is to give the patient information regarding the cataphoric appliance and the effects of the current, and in this way not only educate the patient, but establish a confidence that is very essential for the best success in any operation. The next thing is to ascertain the condition of the teeth to be operated upon. There are two or three conditions where we will not get satisfactory results unless they are modified. One is the presence of inflammation in the dentine. Where this condition exists, I have found it advisable to first reduce the inflammation in order to get the satisfactory results desired. In the teeth of smokers we sometimes find a dense lining in the tooth cavity, which must be removed before we obtain a free flow of the electric current through the tubules of that tooth. I have had the best results from the use of a saturated aqueous solution of cocaine, and in cases, where, for instance, two molar teeth were decayed and cavities approximating, I have obtunded both by filling in between with saturated cotton and applying the current to one of them.

Where teeth have been previously treated with creosote or carbolic acid, I have not been able to get as satisfactory results as where such agents have not been employed. Another thing:

I do not pay any attention to the current passing through the clamp, for I first apply the rubber dam, then adjust the clamp over this, and I know that it is then insulated. I have not yet in my practice found it necessary to insulate fillings already in the teeth.

J. R. CALLAHAN, Cincinnati: It seems to be hard for many dentists to get electrical terms well fixed in mind. The best plan that I have found is to compare the electrical current with a dam and mill race. The dam represents the resistance or the ohms; the water above the dam represents the pressure or the volt; the escape over the dam represents the current in operation or the ampere; and the mill-race represents the shunt.

There are a number of points in the papers that it is very necessary to remember; one is the necessity of having an absolutely constant current. Another is the resistance we have to contend with. Dr. Price in his paper gave the resistance of the body at from 20,000 to 70,000 ohms. This statement greatly impressed me, and also that of the difference in resistance in different parts of the same cavity, and in cavities kept moist and those that become dry. Tooth substance offers more resistance than any other tissue of the body. Taking into consideration, however, that the resistance is lessened the nearer we approach the pulp of the tooth, I generally excavate as much as possible before applying cataphoresis, and it is astonishing how many I finish entirely without finding it necessary to use the current at all.

You all realize the necessity of keeping the electrode in constant contact with the tooth substance or moistened cotton in the cavity, for you get a shock at the breaking of the current. This is apt to occur where the electrode is held in the hand by the operator, and to overcome the objection, I take a piece of gutta percha, warm it and place on the clamp and pass the platinum electrode through this. It holds the electrode in the cavity and you are sure of constant contact, and it also gives one the free use of his hands. Some, it seems, have taken offense at the remark Dr. Price made regarding there not being a perfect instrument yet on the market, but I think that is true. If I were going out with an instrument I would have a storage battery, and a volt and ammeter attachment and a water or shunt resistance. No appliance is complete without a pole changer in connection.

DR. HENRY BARNES, Cleveland: One writer said that he used a large negative electrode, instead of a small one. I have tried the large electrode, but now use one smaller than a silver dollar. I have had difficulty in getting constant current through attaching the positive electrode to the clamp, and find that the result is more satisfactory when the electrode is held with a steady hand. I have used alcoholic solutions of cocaine, but not in the manner suggested by Dr. Barber. Where alcoholic solutions are used, the anesthesia is of less duration than when the solution is an aqueous one. Some months ago I made the statement that the oral fluids used in connection with the cocaine solution would produce anesthesia, even if the rubber dam was not used. When using cataphoresis in that way, however, I do not use a high voltage for fear of injuring the tissues. Dr. Jack advises the citrate of cocaine. I tried this preparation and got no results at first; but when I used it in connection with the oral fluids as a solvent, I obtained anesthesia of the dentine in from five to eight minutes, where otherwise the time required was from ten to fifteen minutes. This short time, though, is not always the case. Where a cavity proximates a filling in another tooth, I cut a narrow strip of photographic film, smear one side of it with gutta percha solution, run it through between the teeth, allowing the dry and smooth side to come next the cavity to be filled. The gutta percha sticks the film to the other tooth and completely insulates the filling. With the current that I am using I have found it necessary to test for polarity before each operation, as the currents are at times reversed.

DR. J. W. CLARK, Louisville: One case that recently came under my observation was that of a pulp to be extracted. Another dentist had endeavored to kill the pulp with an application but was not successful. I applied a twenty per cent. solution of cocaine, cataphorically, and got immediate results, so that inside of eight minutes I was enabled to extract the entire pulp with a broach, and without pain to the patient. Another case was two approximal cavities in the central incisors, which were so sensitive that even the insertion of cotton caused pain. Applied cataphoresis ten minutes, when I was enabled to prepare both cavities as far as the retaining pits. A second application of four minutes enabled me to prepare the remaining portions without pain. I had the same results when applying to proximal cavities in bicuspid teeth.

pids. I have not had good results from the application of cataphoresis to inflamed pulps.

DR. A. L. DEVILBISS, Decatur, Ind.: I can cite a case where the pulp was inflamed from having been treated with arsenic, but the application of cataphoresis made it possible to extract it without pain. Another case that was a good test for cataphoresis was that of a lower molar, badly abraded with mechanical abrasion, so sensitive that the patient could scarcely eat. There was a small cavity on the proximal side of the tooth. Made application of cataphoresis, and the results were excellent. After preparing I touched the surface with chlorid of zinc, then filled, and the patient has experienced no further trouble.

DR. O. N. HEISE, Cincinnati: In regard to the treatment of inflamed pulps and their extraction from the pulp canals, would say that I have done so successfully by means of the electric current. My method is to use at first a very mild current, say of 2 volts (so mild as not to cause any pain), with the cocaine, seeing, however, that the electrode does not come in direct contact with the pulp, but have plenty of cotton intervening, using the positive pole, and in some cases have succeeded better by using both poles, and alternately changing the flow of the current by reversing the poles; let it act until you have relieved the hyperæmia of the pulp, then gradually increase your current until it has thoroughly anesthetized the pulp, after which by means of a fine broach in the handle of the electrode holder, insert broach alongside of the pulp, having, however, reversed the current, using the negative instead of the positive pole; allow it to act for a few moments, until it has decomposed the end of the pulp, which action is shown by the appearance of a froth around the broach. Just how long to leave the negative pole in contact with the pulp is a matter of experience; do not leave it too long, as the negative pole is caustic in its action, and might bring about some pericementitis, although I have not observed it. When sufficiently decomposed, by a little manipulation the pulp can be extracted as a whole, without a drop of blood, leaving the canal in a clean, aseptic condition, ready to fill at once.

DR. W. A. PRICE, Cleveland: I see Prof. Neiswanger, of Chicago, is here. I am sure the society will be pleased to hear from him on this subject.

DR. C. S. NEISWANGER, Chicago: Let me assure you that I

fully appreciate the honor of being called upon to address this large assemblage of the representative dentists of Ohio, and as there are several important papers yet to be read and the time is growing short, I will not detain you long.

That electricity is a therapeutic agent of undoubted value is a fact concurred in by every branch of the medical and dental professions, but in times past so little was understood as to its physical laws or therapeutic action, that it seems almost impossible to elevate it from the domain of charlatany to its proper place. For this very reason I was much pleased that a majority of the papers treating on the uses of electricity in dentistry were from a rudimentary physical standpoint, which shows a start in the right direction, for, let me assure you that it is only by a study and knowledge of its physical laws that we can obtain correct therapeutical methods. You cannot gain the summit in company with the mob of charlatans who have used electricity as a cloak of learning these many years, but you must do it alone. A great reformer does not carry the crowd with him, but leaves behind facts which induce them to follow.

In listening to these papers on cataphoresis and the discussions following them, I have been delighted to note the absence of either enthusiasm or pessimism. That is as it should be. The enthusiast hurts the remedy and injures himself; while the pessimist, with his narrow prejudices, builds around himself a wall which in time he will not be able to surmount.

I am not a dentist, and as "the shoemaker should not judge above the last," I will confine my remarks on cataphoresis to facts which my own experience has proven.

Because a constant current goes from positive to negative, it is generally supposed that all medicaments must be placed upon the positive pole, so as to be *forced* as it were into the tissues by the *direction* of the current alone. Such is not the case, however, for cataphoresis is an electrolytic process, and in every instance the medicament is broken up into its elements, some of them going toward the negative pole and some toward the positive.

In the nomenclature given us by Faraday, those ions or products of decomposition which appear at the anode or positive pole, he called "anions," and those which appear at the cathode or negative pole, "cations."

The anions are electro-negative and are repelled by the nega-

tive pole because they are the same potential as that pole. The cations are electro-positive, and being repelled by the positive pole, whose potential is the same, they are drawn to the negative pole in accordance with the well-known law that "unlike poles attract each other."

Iodin, bromin, chlorin, oxygen, etc., are anions or electro-negative elements and have a strong affinity for the positive pole; therefore, when treating, for instance, an enlarged gland with solution of potass. iodid, we must use the solution on the *negative* pole if we wish to utilize the resolvent effects of the iodin. All of the metals, so far as we know, are "cations" and appear at the negative pole; if, then, we put a solution of potass. iodid on the *positive* pole and complete the circuit through some conducting medium, the potassium hydrate being a metal and a cation, will be transferred through the medium to the negative pole, while the iodin being an anion *will remain at the positive pole for which it has an affinity*, and we will merely have the same effect as from a local application of iodin. All the bases are electro-positive or cations, and if we were using a solution of morphia sulph. or cocaine hydrochlorate, we would apply from the *positive* pole, when the base, which in this instance we wish to utilize, will be transferred through the tissues toward the negative pole, for which it has an affinity. When using a solution of potass. iodid it is not the purpose of the operation to convey the potassium or base through the underlying tissue, but the iodin.

In my first experiments with the so-called cocaine cataphoresis for obtunding sensitive dentine, I used a fifty per cent. solution on the positive pole and had excellent results; then I used a solution of thirty per cent., twenty per cent., ten per cent., and when I finally discovered that I could produce just as complete anesthesia with a two per cent. solution, I began to look around for some other cause for the anesthesia than the cocaine; and to-day I believe it is due more to the *polar action of the current* than to the medicament we use. For aconit on the positive pole of a constant current has the same local effect as cocaine, and it is my belief, although I have not tried it, that a *piece of wet cotton* attached to the positive pole and applied to a sensitive cavity *will do the work*. This may seem strange, especially to those who have not given the subject special attention and I will give you my reasons:

The most definite and well proven points regarding the *polar action* of a continuous current is that the positive pole is acid, sedative, and hemostatic. The negative pole is alkaline, producing a hypersensitive condition and increasing bleeding. Each is diametrically opposed to the other. Dentists just beginning the use of electricity will do well to keep these points in view, as success is largely dependent upon which is used for the active pole.

As far back as the year 1859, Funke discovered that a sound living nerve is neutral or feebly alkaline, but changed to acid on coagulation setting in, or on exhausting it by prolonged mechanical or electrical stimulation. The beginning of the death of the muscle is marked by a progressive acidity and subsequent coagulation of the muscular plasma. The same is true of nerve substance as well. Then, if it is true that the death of the muscle or nerve commences when an acid condition sets in, it is also true that an inflamed or over active condition is due to alkalinity.

All inflammations are primarily local, due as stated above, to excessive alkalinity of the part, not because the system contains an excess of alkali, but that we have an unequal distribution of probable normal alkalinity. We almost fear to state how we believe this pathological condition is brought about, lest we be charged with being too ultra in our deductions; but a few years hence a person may not be considered a "crank," who advocates that it is due to a disturbance of the normal electrical currents traversing the body.

We are glad to quote in this connection from such eminent authority as Dr. J. Mount Bleyer, who says: "Yet all this points to the one conclusion and the one deduction, that animal electricity comes first; that it is the prime factor in all the processes of change, of chemical action, or otherwise, within the living body. That without its stimulus of polarization, no chemical action can be called into life, consequently none can go on, and tissue metamorphosis, which is life itself, must cease."

Why is it then when we place the positive pole over an inflamed and painful surface, that the inflammation and pain subside? Oxygen is set free at the positive pole. Oxygen is an acid maker and the part in contact with this pole being changed to a condition of acidity the temporary death of the part has commenced, or is in a state of sedation, evinced by a circumscribed

anesthesia. But what has become of the alkalinity that existed previous to the application of the positive pole? It certainly has not been neutralized by the acidity of that pole, because that would necessitate an evolution of gas, which has not taken place.

Alkalies are electropositive substances and have affinity for the negative pole. Consequently the excess of alkali at the point of inflammation is transferred to the neighborhood of the negative pole, which immediately assumes a hypersensitive condition, proving that excessive alkalinity causes inflammation, because the part was perfectly normal before the application of the negative pole.

Because of the fact, that alkalies are transferred to the region of the negative pole and produce a hypersensitive condition at that point, is my reason for taking issue with one of the essayists who advocates placing the indifferent electrode on the cheek. The fact is, the larger the indifferent electrode (which in most dental operations is the negative terminal of the battery) the less irritation we have in the tissues underlying that electrode because it is distributed over a large area, and as all the electricity that passes through the large indifferent electrode must also pass through the small active electrode within the cavity of the tooth, we can concentrate the *polar effect* at the positive terminal (in the tooth) and disseminate still more the irritating effect at the negative pole *by separating the electrodes as far as possible*, all of which teaches us two facts, viz: (1). Not to use a small indifferent electrode; and (2). Not to place it upon the cheek, but upon the hand or as far removed as possible from the active electrode.

In the excellent paper read by Doctor Price, he calls attention to the difference in resistance when the indifferent electrode is placed upon the cheek and when placed in the hand: the latter being much greater, but if the skin upon the hand were the same texture as that upon the cheek the difference in resistance would be inappreciable, because the resistance of the tissue underlying the skin is almost nil.

The so-called anesthesia produced by a rapidly alternating current, is brought about in a different manner than with galvanism and is more the result of mechanical than chemical action.

The alternating current which comes into our houses for lighting purposes, has a pressure of 52 volts and alternates about

133 times per second, is a good sample of this manifestation of electricity; the rapid impulses given the muscle by this current brings on a tetanic spasm, which soon wears it out, causing it not only to lose its normal animal current, but to assume an acid condition, which, in this instance, is not due to polar action as with the positive of a galvanic or direct current, but by bringing on the temporary death of the part by fatigue from excessive and prolonged electrical stimulation.

I therefore believe it is possible to utilize this current for obtunding sensitive dentine, and taking into consideration that most of the smaller towns throughout the country are supplied with this character of current, it is worthy of your serious consideration and ought to be given a thorough test. The Jewell Graphite Rheostat, or in fact any good controller arranged on the shunt principle, will control this current as well as the 110 volt direct.

One word more and then I am through: Doctor Price has suggested to me that a milliampere meter, expressly for dental uses, would be an invaluable addition to secure definite results and reliable data in this class of work, and is of the opinion that the range of scale should be ten milliamperes subdivided into one-tenth milliampere divisions. It is therefore my intention to present the views of Doctor Price to Mr. E. W. Jewell, the inventor of the Jewell standard measuring instruments, with the hope of being able, in a few weeks, to show you an instrument of this kind.\*

DR. W. BUZZELL, Port Clinton: I would like to ask the gentleman a question: whether the accumulation of fat under the skin where the negative electrode is placed, does not have its influence on the amount of resistance?

DR. NEISWANGER: Yes.

DR. L. L. BARBER, Toledo: How small an amount of current do you think will do the work of obtunding dentine?

DR. NEISWANGER: The milliammeter should measure from three to five milliamperes, depending on the size of the cavity being treated—two or three milliamperes in a small cavity would do the same work as five milliamperes in a large cavity.

\* [Since the above has been put in print, we understand that a milliampere meter of this description has been constructed by Mr. Jewell, and is for sale by the McIntosh Battery and Optical Company, of Chicago. The scale has a wide range and is divided into 1-10 milliampere divisions.—E.D.]

DR. J. S. CASSIDY, Covington, Ky.: I have been greatly pleased with the remarks of Dr. Neiswanger. It made me feel good when he said that cataphoresis is an electrolytic process. Perhaps this statement is a little dogmatic, but yet I have held that it is at least partially an electrolytic process. I was pleased to hear the Doctor refer to the use of the negative pole in connection with certain medicaments, for that is just what I spoke about at the Mississippi Valley Dental Society last April, and inquired whether we should not use the negative pole instead of the positive when we wanted to get the full effects of such medicaments as iodin, etc., but the question was not fully answered at that time. A long time ago I used to apply various medicaments electrically. With KI decomposed thus, there was no appreciable penetration of the freed iodin. This fact is not to be wondered at, when we understand that electrolytes are composed of electro-negative and electro positive radicles, and that the laws of electrolysis must be obeyed. The negative radicle iodin, wants to stay with the positive pole and therefore does not penetrate; but if free iodin be used in *aqueous* solution, then penetration occurs. Why is that?

DR. NEISWANGER: After the iodin remains long enough to become the same potential, it is repelled and thus driven into the tissues. The more highly electro-positive the substances are, the deeper will they penetrate into the tissues. This process should be called Cataphoresis, and Anaphoresis.

DR. CASSIDY: Yes; and might not the iodin be forced toward the cathode by reason of the more highly electro-negative oxygen, set free simultaneously from the waters preempting the anode? Cocain hydrochlorid is a good conductor and decomposes into free H Cl, and the alkaloid cocain; the alkaloid itself does not decompose, and being electro-positive, in its nature, tries to reach the cathode, or in other words to get as far away from the positive pole as possible.

DR. W. A. PRICE, Cleveland: We dentists see things somewhat differently from the physicians. If cataphoresis is continued, through even a very thick layer of dentine, long enough, we get a thorough anesthesia of the pulp, which we could not do if the effect was produced solely by electrolysis. Suppose we wish only to anesthetize the dentine, our pain limit for the current, which controls the amount, is not decided by the sensation

in the tissue we are anesthetizing, but in another tissue in the path of the current, viz: the pulp. The physician does not have this condition, nor anything similar to it, and this entirely prevents comparison of methods. The idea of placing the negative pole at the greatest distance from the positive is all right if the action is only that of electrolysis, but if it is partly or largely osmosis that takes place, then it is different, and the negative pole should not be placed at such a distance. The more resistance you have to overcome the more pain there is produced with variations of current, so if you want the least pain you must have the least resistance. To illustrate the above, if there are 60,000 ohms resistance in a tooth and 10,000 in the patient elsewhere, then the zone of neutrality of electric influence must be somewhere in the dentine of the tooth being operated upon and the effect on all tissues beyond that, including the pulp, would be stimulating and not sedative, according to the theory of electrolysis only. If the end of the root is calcified, or something of that sort, it is a question whether we do not get dissipation of the current toward the gum, and not through the end of the root.

DR. J. F. STEPHAN, Cleveland: Dr. Barnes spoke of the use of citrate of cocaine. I have used this preparation and have been well pleased with the results. I was surprised in one case where I used it in a cavity; there was a cavity approximating in the adjoining tooth, and although I treated only one of the cavities, I found that the other had been desensitized also, so that I was enabled to excavate it clear to the grooving points. My method of applying cocaine is a little different from that of others, so far as I know. I take the crystal or powdered cocaine and apply to the surface of the cavity, then place a piece of cotton moistened with water over the cocaine in the cavity, then apply the electrode on the cotton. I have gotten satisfactory results in this way, in less than five minutes. May it not be possible that the citrate of cocaine is separated into its elements more readily than the hydrochlorate, and the apparent difference in time of its action be due to the difference in affinity of decomposition? For obtunding the pulp I think the citrate is superior to other preparations, and I like to use the crystals better than an aqueous solution.

DR. H. F. HARVEY, Cleveland: Where a cavity is partially opened and you apply cold water, it produces pain, so I have

practiced warming the solution before placing it in the cavity, and find that it is an advantage. I warm the slab in water, and then make up my solution on the warmed slab. By doing this you will save your patient considerable pain.

W. H. HERSH, Piqua: In regard to the fountain spittoon accident that I cited in my paper, the water had splashed over the cuspidor, so that when the patient accidentally touched the cuspidor with the back of her hand, she got a ground. I had previously warned her of the danger. For all I use the shunt current, patients are thus liable to get a shock, but it is nothing compared with what it might be if the 110 volt current were used direct. Taking these things into consideration, I want to use a current that is reliable and yet not dangerous in case of such accidents, and therefore I do not use the 110-volt current. Dr. Gillett says he is not sure but that the battery is best. Storage cells are best, perhaps, but it is so much trouble to keep them in order.

Someone spoke about a blister being produced where the negative electrode came in contact with the tissues. I have not used current enough to produce a blister, but have several times got a deep reddening of the parts.

DR. J. TAFT, Cincinnati: There are many things in regard to cataphoresis that should receive more consideration and study, as, the varying susceptibility of patients to the electric current; decomposition of the medicament used—is it always decomposed? The extent of penetration of the medicament; it is the presumption that it penetrates deeply; if so, how is it accomplished? Some say that the current carries the substances into the tissues, but this is thought not to be the case by those who think deeply on the subject. There is not enough vascularity in the teeth to account for deep penetration; the tubules are already full of material, completely occupied, so it seems it would be with difficulty that deep penetration could be accomplished.

One speaker said that he first treated the dentine to reduce sensitiveness, then applied cataphoresis. This seems strange to me, to get a cure before applying that which you expect will cure. Does cataphoresis destroy the life of the dentine? There is an uncertainty about the efficiency of the process that should receive more attention. Many cases fail. Why is it, and where do these failures occur? Then, the condition of the teeth to which the current is applied should be thoroughly studied.

DR. H. G. HUSTED, Oberlin: I generally turn on a number of cells until the patient feels the increasing sensation, and then turn off one, which immediately relieves it. There is a great difference in patients. Some will stand twenty times the amount of current that others can.

DR. L. L. BARBER, Toledo: When I have cases where the teeth are excessively sensitive, I place a temporary filling in the cavity, and when removed, what appears to be the normal dentine is found. Dr. Bell stated that where escharotics had been used we could not get the desired effect from cataphoresis. Teeth are bleached where arsenic has been used to destroy the pulps, and I have, after the application of arsenic to destroy a pulp, and found it still sensitive, taken out that pulp without pain by means of cataphoresis and cocaine.

DR. HENRY BARNES, Cleveland: I had a unique case some time ago. It was that of a cavity on the labial surface of a tooth, where I had to hold up the rubber dam with an instrument. Applied cocaine cataphorically until the cavity was completely desensitized, when the instrument I was holding slipped, and the dam pulled away far enough to admit saliva, when sensitivity immediately returned, so that when I touched the cavity with an instrument pain was felt by the patient. I thought that I had touched the gum instead of the dentine, but a second attempt was just the same, and I had to reapply the current before I could continue the work painlessly. What was the cause of this? Has anyone else had a similar experience?

DR. HOUGHTON, Columbus: You were probably surcharged with electricity yourself, and when you used an instrument on the tooth it caused a shock to the patient.

DR. W. A. PRICE, Cleveland: There is a condition involved in the problem of Shunts, of which I had not time to speak, in my paper, and which is of considerable importance in the particular condition with which we have to deal. It is the relation of the total resistance of the circuit to the relation of the shunts themselves.

You remember we deducted as follows: Suppose a shunt around the patient. Let  $p$  represent the resistance of the patient, and  $s$  the resistance of the shunt, and  $S$  and  $P$  the currents in amperes respectively. Then if  $V$  be the potential difference in volts at the terminals of the shunt and patient, it follows from Ohm's

law that  $S$  equals  $\frac{V}{s}$ , and  $P = \frac{V}{p}$ , and  $\frac{P}{S} = \frac{s}{p}$ ; or the current strengths in the patient and shunt are inversely as their resistance.

Also by a well-known rule in proportion, it follows that  $\frac{P}{S+P}$  equals  $\frac{s}{s+p}$  and  $\frac{S}{S+P} = \frac{p}{s+p}$ ; but  $S+P$  is the sum of the currents flowing through the shunt and patient respectively, and therefore is equal to the whole current in the circuit, let us say  $A$  amperes, hence  $\frac{P}{A} = \frac{s}{s+p}$  and  $\frac{S}{A} = \frac{p}{s+p}$ .

What is the multiplying power of a shunt? Since  $A = \frac{s+p}{s} \times P$ , the fraction  $\frac{s+p}{s}$  is frequently called "the multiplying power of a shunt," that is, the quantity that the current flowing through the patient must be multiplied by to obtain the total current.

As an example of the last equation, let us suppose that we desire that  $P$  shall be  $\frac{1}{10}$  of  $A$ , then  $\frac{s}{s+p}$  equals  $\frac{1}{10}$ , or  $s$  equals  $\frac{1}{9}$  of  $p$ .

It would of course be possible to substitute for the two resistances, the patient and the shunt ( $s$  and  $p$ ), which are in parallel, a single wire of  $x$  resistance, such that *for the same potential difference v, at its terminals*, the current flowing through it should be equal to the sum of the currents flowing through the two parallel circuits. To find  $x$  we have the current that would flow through it equal to  $\frac{v}{x}$ , then the current flowing through  $s$  equals  $\frac{v}{s}$ , the current flowing through  $p$  equals  $\frac{v}{p}$ . Therefore, since  $\frac{v}{x}$  equals  $\frac{v}{s}$  plus  $\frac{v}{p}$ ,  $x$  equals  $\frac{sp}{s+p}$ , or if two wires be in parallel, then the product of their resistance divided by their sum represents the resistance of a single wire through which a current will pass, equal to the sum of the currents passing through the two wires, for the same potential difference. Such a single resistance is called "the combined resistance" or "the parallel resistance" of the two.

From what has preceded we see that when  $P$  is  $\frac{1}{10}$  of  $A$ ,  $\frac{sp}{s+p}$  equals  $\frac{1}{10} P$ , or the combined resistance of the shunt and patient is  $\frac{1}{9}$  of the resistance of the patient.

In the same way, if there be any number of shunts  $a$ ,  $b$ ,  $c$ ,  $d$ , etc.. in parallel, and  $x$  be a single resistance, that *with the same*

*potential difference* at its terminals the current that will flow through  $x$  is equal to the sum of the currents that flowed through all the resistances  $a$ ,  $b$ ,  $c$ ,  $d$ , etc., the *combined resistance*  $x$  equals

$$\frac{1}{1+a} + \frac{1}{1+b} + \frac{1}{1+c} + \frac{1}{1+d}, \text{ etc.}$$

The insertion of a shunt diminishes the resistance of a circuit from  $p$  to  $\frac{sp}{s-p}$ . In some cases this produces practically no effect on the current, so that the current flowing through the patient will be  $\frac{s}{s-p}$  of the current that *was* flowing through it *before the insertion of the shunt*. But in other cases this variation of the resistance in the circuit materially affects the total current, so that although  $P$  is always  $\frac{s}{s-p}$  of the total current, this total current may be so increased by the diminution of the total resistance that the fraction  $\frac{s}{s-p}$  of the new total current, is practically as large as the previous total current, or in other words, shunting the patient may produce practically no diminution in the current passing through the patient. I mention this because the conditions we are associated with are such that this item is of great importance.

It is easily demonstrated (see Ayerton) in this way.  $B$  is a battery of 6 cells in series arranged with a cell selector.  $M$  is a galvanometer of very low resistance.  $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$ , resistance coils in the main circuit.  $P$  is a galvanometer of say 500 Ohm's resistance, also in the main circuit, but fitted with a shunt  $s$ . Any one of the coils or all, can be cut out with a switch.

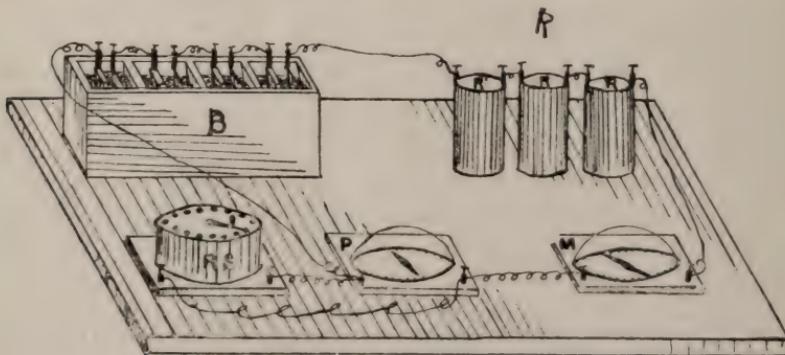


Fig. 9.

The resistance in the shunt  $s$  can be varied by moving its lever. Then it is found that if the resistance in the main circuit

is fairly large, say 1000 Ohms, altering the resistance of  $s$  alters the deflection of  $P$ , but does not sensibly alter that of  $M$ ; while on the other hand, if the resistance in the main circuit is small, that is if the four resistances  $R$  are cut out, then the value of  $s$  may be altered within wide limits without altering the value of the deflection of  $P$ . But the deflection of  $M$  will be large when the resistance in  $s$  is small, and small when the resistance in  $s$  is large.

The mathematical working out of this condition is quite simple, but I will not take the time to give the equation here. If any of you contemplate experimenting with shunts for use in cataphoresis, you will find this the foundation principle on which to build your apparatus. For in the patient, which would be represented by  $P$  in the last diagram, we have a very high resistance, and a widely varying one. Consequently, we have the condition of  $S$  for the shunt in the exaggerated condition of all of  $R$  cut out.

This has brought out the ingenious devices for varying the quantity of  $R$ , and transferring part of it into the circuits of  $S$  or  $P$  in various relations. In this illustration think of  $P$  as the patient.

Now, this would not raise a new problem in ordinary electric controllers, but in the very peculiar and complicated conditions with which we contend in the patient, it does. Since we are increasing, to a certain extent, the total resistance of the circuit in which the patient is, thereby causing increased pain by any variation of potential, since the potential is higher, which was clearly demonstrated with the frog's leg. I believe that no question of electric therapeutics has ever arisen involving so many complications of electric physics and physiology, and it will be equally impossible for the electrician or the therapist to work it out alone.

## Cataphoresis.\*

BY O. N. HEISE CINCINNATI, O.

THE subject of cataphoresis, for this evening's discussion, is one of vast importance to us all, inasmuch as it is the only means up to the present time, of definitely relieving and controlling pain, by its local or direct application to the parts subjected to our operative procedures.

It is only within the last year that it has been prominently brought before the profession, yet it is no newly discovered fact or method, as in 1833 a Frenchman introduced iodin into the tissues in this manner, and in 1859 Richardson used it and from that time on various articles have appeared at distant intervals in our journals, until of late it has become a subject of general interest.

Cataphoresis, as described by Dr. Peterson, in his article in the International System of Electro Therapeutics, is a purely physical process, entirely distinct from electrolysis.

The definition of cataphoresis is the flow of fluids from the positive to the negative pole.

The apparatus to be used can be one of many on the market now. I, myself, having a chlorid of silver battery of 32 cells, merely added a Bailey Water Rheostat, with which I have been able to control the current to perfection. It is not one I would advise today, as much more perfect ones are to be had. Personally I have, so far, had a decided preference for a good battery of some kind, as the current does not fluctuate or have the wave-like flow, which you can easily observe in the incandescent electric light, as the influence of a fraction of a volt in a tooth is very perceptible. Also avoids any possible danger of contact of arc wires. These objections may some day be entirely overcome, and the danger today is not great, but I claim we have not the right to take even that little chance with our patients, as the battery will give us all the current we want and under proper control. I trust that in time we will not only have better devices for controlling or managing the electrical current, but also have

\* Paper read before the Cincinnati Odontological Society.

improved medicaments suitable for cataphoric action, and right here I might mention that we are in a fair way of having several preparations put on the market, which bid fair to exceed all our former results.

I refer namely to a new salt, developed from the union of guaiacol and cocaine, and something entirely new, discovered by Prof. Prescott, of Ann Arbor. Just what the nature of these new preparations will be, or how much better than the solutions now used, I am unable to state, as it is only from reports I give this information.

Regarding the solution with which I have been most successful, would say that at first I used a small quantity of the so-called Schleich solution, which contains a small amount of cocaine, morphia and salt (Na Cl.), which, as you well know, is used for hypodermic injections, and is the so-called infiltration method of producing local anesthesia, and this method, let me say, is deserving of far more extensive use than it has had. To this solution I add cocaine almost to saturation. However, for the last few months having made a similar solution of cocaine in electrozone, it seems to be all I can ask for, and thus far have met with no case that I could not allay the sensitiveness. Where I found it hard to influence the tooth, it has been my plan to resort to the action of dilute hydrochloric acid (50 %), for a few moments, then reapply the solution and turn on current, and in this manner have controlled some very stubborn cases of extreme sensitiveness. Just what the action of the acid is I am not prepared to say to a certainty. It is either that it has the effect of opening the dental tubuli, by dissolving the lime salts, allowing the current to carry the cocaine more freely into them, or that it increases the conductivity of the solution, and possibly both its action as an acid, and the power of increasing the conductivity of the liquid are the means of enhancing its action.

Ordinarily I would not advocate the use of hydrochloric acid, as the cocaine solution in electrozone is sufficient to bring about good results with the use of about 8 to 14 cells of the chloride of silver battery. It is seldom that more than 12 to 14 cells are required. The time limit, of course, varies with different cases. Ordinarily it consumes from eight to ten minutes, and if sensitiveness still exists, another application of about five minutes will suffice.

I pay little or no attention to time ordinarily speaking, as the feeling of the current in the tooth shows more plainly than anything else how I am progressing in the reduction of sensitiveness, and turn on the current as the sensation of it disappears. When the patient feels no more current passing, or very little, I then let it continue for a few moments, and know positively that there will be no more pain in excavating. Should it return before I have finished, merely reapply solution to cavity and turn on current, which can now be done rapidly, and in a very few moments the pain will have left, and no feeling from the cutting of the bur or excavator.

Cataphoresis no doubt is one of the grandest methods brought to our notice; not only in allaying the sensitiveness of dentine, but the destruction of the pulp can be accomplished by its means, without pain, and by merely reversing the poles, introducing a needle or small steel broach alongside of the pulp, to the end of the canal, allowing it to remain a few moments, in order to decompose the end of the pulp. We can then extract the remains without a drop of blood or particle of pain. The negative pole as it arrests hemorrhage and oozing, can be used to good advantage in the bleeding from the pulp canal, where other means have been used to destroy the pulps. Care must, however, be exercised in not prolonging the action of negative pole, as it is caustic if carried too far. In using the negative pole we are depending on electrolysis and not cataphoresis, and it is well in cataphoric work to see that no metal comes in contact with the parts where the negative pole is applied, when the current is used for the allaying of sensitiveness. Having had a disagreeable experience in failure to observe that precaution some time ago, in applying the negative pole to the cheek, as I generally do, I carelessly had not observed that the metallic rubber dam holder happened to be in contact with the wet negative pole. My patient being one of the good natured kind, taking for granted whatever I did was necessary, so did not complain of the burning pain, and as a result, after taking off the rubber, I found a small spot where the holder had pressed hard against the skin to have actually cauterized it, but fortunately it was not deep enough to have left a permanent scar. It, however, taught me a lesson which I shall not soon forget.

The electrolytic action of the current is one of great utility

to us, as well as its use in the bleaching of teeth and sterilizing, and has been of decided benefit to me in various diseases of teeth and mucous membranes. To go into detail regarding it, however, would extend this paper beyond its limit.

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### Electro-Physics.\*

BY E. T. LOEFFLER, B.S., D.D.S., SAGINAW, MICH.

THERE are, to my mind at least, a number of practical difficulties to prevent electricity from becoming very popular, either in the dental or the medical professions.

Foremost stands the absence of any theoretical and practical teaching in our public schools. Why this should be I am unable to explain, when we are living as it were, in an age of electrical phenomena.

Next comes the question of the apparatus required, which kind is the best, where to obtain it, and how to keep it in working order.

In studying the phenomena of nature our work is largely accomplished by the aid either of observation or experiment. In the science of astronomy we can only wait and watch and observe the signs which nature makes to us, and then interpret the language in which she speaks.

In the realm of electricity, however, we cannot depend much upon observation, and it is only in the laboratory by patient experiment, that most of the secrets of electricity can be learned.

To overcome many of these difficulties and to make ourselves the better fitted for the age in which we live, there are certain facts that we, as an intelligent body of men, ought to constantly keep before us.

1. The necessity of special teaching in our dental and medical schools.

2. The necessity of a proper knowledge in physics so that we may develope original work in our laboratories.

3. The strides that electricity is making in the arts.

To be sure, in many of our large universities and colleges

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\*Read before the Saginaw Valley Dental Association, Nov. 7, 1896.

there are separate departments for this important work. Electrical laboratories, departments of electrical engineering, equipped with every possible facility, have been added to carry on all necessary experiments. Such departments and laboratories, however, are, as a rule, wanting in our professional schools.

If electro-therapeutics, the branch in which we are interested, is to be placed upon a firm basis, it must be practiced by thoroughly competent professional men. Such competency does not consist in office experience alone, nor in clinical observation, nor in acuteness of diagnosis, but he who would make this branch of professional work a success, must know very much of the nature of the energy that he is using, as well as the laws which govern it. In such a way only may we hope to give satisfactory answers to many of the conundrums that are thrust upon us constantly by those who doubt the accuracy of our statements or statistics. This can be done thoroughly only by following closely the trend of modern scientific research, and in fortifying ourselves with a thorough knowledge of all that relates to the physics of the subject; in using this word physics I mean also to include physiological chemistry. Chemism or chemistry, it is claimed by many, is simply the manifestation of a difference of electrical potential of the molecule by which combinations are made or formed.

Dr. W. J. Morton, of New York, is a high authority on this subject, and if further consideration of his ideas shall give them a stamp of exactness, we may arrive at last at a perfect understanding of the current to be used in treating disease from the stand-point of its electrical potential.

This study of electricity, as difficult and scholarly as any, can only be discussed and argued by those whose training has been such as to give them a right to be heard. Such discussions are valuable, but mere talk to take up time can be of no special benefit.

Perhaps enough has been said to emphasize the importance of the subject before us suffice it to say that an account of the many uses to which electricity is put even in our own field of work a more thorough knowledge of the nature of this agent, how to generate it, the laws that govern it, etc., ought to be the height of our ambition.

What is the purpose and plan of this paper, you may ask? Let me explain as briefly as possible. There are always two ways

in which a scientific instrument can be used, the blindly mechanical and the intelligent. In the first case the employer of the instrument follows certain rules laid down by the inventor or by some one who knows more of the nature of the construction. In the second case the employer is constantly verifying the rules applied with the instrument with what he has learned of the inner mechanism and principle of action.

At this stage of physical advance no satisfactory definition of the term electricity can be given save that the ordinary mechanical principles and the medium called ether suffice to explain electricity.

In other words, we may say then that thus far scientific men have been able to give a satisfactory answer to the question,—“What is electricity?”

If we can, in the short time at our disposal, get a clearer insight into the fundamental principles which underlie this subject and have perhaps a brief explanation of some of the most important technical terms in use, we may consider the time well spent to most of us an explanation of the terms, mass, kinetic and potential energy. Sir Wm. Thomson's Theory of the Physical Constitution of Matter is perhaps unnecessary.

What are some of the most important units of measurements?

Scientists have adopted what is known as the French or C. G. S. system. These are the units of length, time and mass. From these we have derived units. For instance the unit of acceleration is an increase every second of a velocity of a centimeter per second.

A force is whatever produces or changes motion in matter, and hence the unit of force is defined in terms of the units of acceleration and mass, as the force which produces unit acceleration in a unit of mass. In the C. G. S. system it is called the *dyne*.

The *dyne* therefore is a force which every second increases the velocity of a gram mass by one centimeter per second.

The C. G. S. unit of work done by a dyne when exerted through a centimeter is called the *erg*.

For convenience of treatment, electrical phenomena have been divided into three departments.

1. Static, (or Franklinic) electricity.
2. Kinetic, (or Voltaic)         “
3. Induced, (or Faradic)         “

In addition to these we have the subject of magnetism.

As had been mentioned, our ideas are still very dim and vague as to what electricity is, so we can at the outset only define the thing we are going to study as that which is made manifest in a certain way and has certain properties.

We will assume that most of those present have a more or less clear conception as to what is meant by each kind of electricity, and how it may be produced. It may be necessary, however, to state that the electricity in each case is alike, only that they differ greatly in their method of production, and certainly in regard to potential and quantity.

In the case of static electricity we may have a high potential and small quantity, while in the other two we have a comparatively low potential and a large quantity.

Inasmuch as many of the terms used in treating this subject have been fully explained by one of our members two months ago, any further explanation is, perhaps, not necessary. With this understanding I shall only attempt to explain the more difficult terms used or those which are generally misunderstood.

Potential. The conception of potential is one of the most important in the treatment of electricity. Unfortunately it is also one that has acquired the reputation of presenting considerable difficulty to the uninitiated.

This evil reputation it probably owes to a certain confusion in the way in which it is frequently explained. To understand it clearly we must remember clearly the difference there is between the idea or meaning of a physical property and its measure. The idea can be but one though the modes of measurement may be many. The quantity of electricity in an electric charge is a conception analogous to that of a quantity of material fluid. So the idea of electrical potential is analogous to that of level in a body of water; that is, level as indicating a condition by which gravitating matter, such as water, can do work in descending to a lower level. The electrical potential of a conductor is that condition of the conductor in virtue of which the electricity tends to pass from the conductor to the earth, and in so passing do work, the earth being considered at zero potential.

*Electrical Measurement.*—Twenty-five years ago the units in electrical measurements were altogether arbitrary or better still a mere collection of qualitative results.

To-day almost every branch of science has its own language, made up of its technical terms, which in time become absorbed even into general speech.

Amperes, volts, and ohms, are no longer possessed of meaning only to the initiated, but are becoming as familiar as the terms pounds, gallons and inches. The practical unit of E. M. F. is the volt equal to 1,000,000,000 C. G. S. of electro-motive force — $10^8$  C. G. S.

When an electro-motive force does work, a current is produced. The practical unit of current is the ampere equal to  $= \frac{1}{10}$  C. G. S. unit.

A current of one ampere passing for one second gives a quantity of electricity called the *coulomb*.

A current of one ampere is maintained by one volt through a resistance of one practical unit. This unit is called the *ohm* and equals  $10^9$  C. G. S. M. This equals the resistance offered by 460 feet of ordinary telegraph wire.

A volt equals nearly an ordinary Daniell's cell, or a Daniell's cell equals 1.076 volts.

To recapitulate in briefer terms, electro-motive force means electrical pressure. Electro-motive force is not measured in pounds per square inch like steam or water pressure, but in volts; and a volt is the pressure given by one standard cell.

Resistance is measured in ohms and an ohm answers to the resistance offered by 460 feet of ordinary telegraph wire, approximately. Strength of current is measured in amperes. Speaking of a water-wheel, we say, we need a current flowing at the rate of so many gallons per minute to drive it; speaking of an electric lamp, we say, we need a current of from 1 to 50 amperes to keep it glowing. The term "coulomb" is a unit current or ampere, which transmits the unit quantity of electricity per second. Hence, the unit of electric quantity is called the coulomb and just as the unit flow of water through a pipe might be taken as that which allowed one gallon of water to pass any point in the pipe during one second of time, so the ampere is the strength of current, the rapidity of flow, which allows one coulomb to pass any point in the circuit during one second; so that if a constant current of one ampere has been flowing for one hundred seconds in a circuit, then we know that 100 coulombs of electricity have passed any point in the circuit during that time.

After having given a brief explanation of what is known as an ordinary Faradic apparatus, illustrating its action and describing the different parts of the accompanying figure, it may be interesting to sketch, in a few words, the development and present status of this instrument, which furnishes the induction current for medical purposes. Having carefully looked up the history of this subject, I am able to say that no progress has been made for decades since the completion of the galvano Faradic instrument, when it displaced the earliest forms of the magneto induction apparatus. Any instrument of the present day, on either side of the Atlantic, is perfect in one way: "It works well," is well made, extremely satisfactory for the price, and can be had in suitable shape for any purpose the practitioner may desire, as pocket-box, or stationary battery. But whilst all instruments now made work well and "buzz" smoothly, the great majority furnish but one form of current, thus greatly impairing their utility, and to this fact mainly is due the secondary position occupied by the Faradic current, as well as the limited therapeutic use.

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### Electro-Plating of Crown- and Bridge-Work.

BY W. H. HAYDEN, D.D.S., YOUNGSTOWN, O.

AMONG the various applications of electricity to the practice of dentistry, I consider as not the least in value the electro-plating of crown- and bridge-work with pure gold.

In the use of coin gold it is quite impossible to get the old or yellow coins and those of more recent coinage have that objectionable reddish color which will oxydize in almost all mouths. Even the ordinary 22k. plate will discolor in many mouths, but pure gold in very few.

To a pint of distilled water add 30 grains of photographer's chlorid of gold and about 60 grains cyanide of potassium. When plating suspend in solution from positive wire a plate of pure gold, at least double the size of article to be plated and from the negative wire the finished crown or bridge. Turn on current from a half minute to one minute and remove crown and rub it with bi-carbonate of soda. Repeat the operation until the desired result is obtained, usually two or three times suffice.

It is my plan to leave the crown in this condition instead of burnish-

ing, as having a dull rather than burnished surface, it is far less conspicuous in the mouth.

Such plating on surfaces not exposed to wear in mastication will wear indefinitely, and wear from mastication will in itself keep it bright.

I use the current from the 110 volt Edison current with a resistance of two 50 volt 16 C. P. lamps in series, which gives me about one ampere. I also have a 10 cell storage battery for cataphoric use giving 20 volts which does the same work, using a 20 volt 6 C. P. lamp as resistance.

Those having cataphoric appliances using dry cells can readily adapt that current by using the proper resistance.

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### Cataphoresis for Obtunding Dentine.

QUESTIONS:—

- (1). *On what per cent. of patients do you use it?*
- (2). *About what per cent. of cases, where used, are successful?*
- (3). *Do you test your current for positive and negative before each operation?*
- (4). *What kind of a current are you using?*
- (5). *Have you experienced any unexplainable phenomena in its action, etc., as regards current, shock to patient, unexpected action, etc. Cite some unusual incident that has occurred in your practice.*
- (6). *What medicaments do you use, and what sort of solution?*
- (7). *What is your opinion of its future uses in dentistry?*

L. E. CUSTER, B. S., D. D. S., Dayton, Ohio:

(1). I use cataphoresis, or "anaphoresis," if you will, in those cases where the more quickly applied obtundents do not give sufficient relief, which is probably 10 per cent. of the sensitive cases presenting. I do not use it every day, but possibly every other day would be the average.

(2). The success depends more upon the knowledge of the principles involved in cataphoresis, and the proper use of appliances, than upon the patient. I do not think there is a case of

sensitive dentine but which can be entirely relieved by cataphoresis, both in theory and practice. Cataphoric action is positive, and the extent of anesthesia is approximately proportionate to the length of time, multiplied by the voltage.

(3). When my appliance is once wired for battery use and poles tested, there is no occasion for further testing. In those cities where the Edison current is furnished to its customers and measured by electrolytic meters the appliance may be once tested for poles, and that will be sufficient. But in some cities and small plants, supplying only a building, or a few at most, the poles may be changed at times. In this case the operator should always test for poles before the operation.

(4). I am using the Edison 110-volt current satisfactorily, and occasionally use a battery, more for the purpose of testing than otherwise. In some cities, and under different circumstances than those surrounding me, I should not use the commercial current at all.

(5). I have experienced a number of unexplainable phenomena—at the time. Subsequent investigation has cleared them all. My most interesting case was reported in the December OHIO JOURNAL.

(6). The object is to project cocaine into the dentine, and I therefore use *cocain*, with just enough water to put it in the necessary condition for its being carried by the current.

(7). The future of cataphoresis, I think, will be this: It will become a method of practice for those operators who are painstaking, who are sympathetic, and who do not allow themselves to be crowded in their engagements. The universal adoption will depend upon the simplicity and perfection of the appliance, and the ease and facility with which the electrodes are applied.

H. W. GILLETTE, D. M. D., Newport, R. I.:

(1). I am unable to give any accurate estimate of the percentage. I use it for all cases of severe sensitiveness, when I know, or have good reason to expect, that other more simple means will not suffice. I sometimes use it five or six times in one day, and sometimes not at all for several days.

(2). One hundred per cent.

(3). No. I test it frequently, as I use my apparatus in several different ways, and after changing cords, etc., it is well to

be sure of the polarity. I recently discovered the cause of difficulty a brother practitioner was having to be in the change of polarity in the wires of the street current he was using. When street current is used, it should be remembered that this may occur by reason of changes in the central station. The milliampere meter is frequently a sufficient indicator of polarity.

(4). Current from a set of dry battery cells, and also from 110-volt incandescent system, each controlled by a G. M. Wheeler Fractional Volt Selecter.

(5). No.

(6). For obtunding dentine, twenty to thirty per cent. aqueous solution of Merck's cocaine, freshly made. For bleaching, twenty-five per cent. aqueous pyrozone. For disinfection of dentine, meditrina, undiluted, or formalin solutions. For pericemental inflammation, tincture iodin comp. (diluted one-half, usually.) For other conditions, such drugs and solutions as may be indicated.

(7). In my opinion, cataphoresis is a permanent feature of dental practice, and fills a demand that nothing else which we yet know of can satisfy. It is a process to be used with care and judgment for *selected* cases, and I anticipate that the progressive practitioner will find the process an absolutely essential one in every-day practice. Further investigation is needed to provide means of reducing the time required for application below the present average of ten to fifteen minutes.

WILLIAM J. MORTON, M.D., New York:

(1). Experimentally entirely for dentists for purposes of demonstration.

(2). Have found no cases of failure in my experience.

(3). To test the polarity is of course essential. It should be tested each time by aid of a piece of wet litmus paper or paper wet with a saturated solution of iodid of potash.

(4). Any "continuous" or so-called galvanic current will do, whether obtained from ordinary galvanic (voltaic) cells or from the street main.

(5). None.

(6). R. Guaiacol 3j.

Cocain hydrochlorat anhydrous gr. ji. m.

S. To apply.

(7). It must prevail and become a universal practice of dental surgery. At present, by using only aqueous solutions of cocaine, too much time is required, namely, from 20 to 40 minutes. By using guaiacol, as I have advised, the time is cut down, in my experience, to six to eight minutes, thus making the process a practical one.

HENRY BARNES, M.D., Cleveland, O.:

(1). In about two-thirds of cases, which means use and non-use for the same patient dependent on the case.

(2). For obtunding sensitive dentine, success is the rule in probably 95 % of cases, for failure is a very rare exception. For obtunding pulps have success in only about 33 % of cases.

(3). Yes; as it is very important and may prevent failure.

(4). 110 volt from power generated in building, with Wheeler Volt Selecter.

(5). Yes; all trouble of this nature may be prevented by a personal inspection of wires, insulators, etc. Patient got a shock from placing his feet on radiator.

(6). Citrate cocaine placed within cavity and small piece of cotton, moistened with the oral fluids, and placed thereon. Sometimes a little electrozone with oral fluids will greatly assist. Solution in this case is high in %.

(7). Its use will continue to increase as we become more familiar with it. Notably in the treatment of root canals, perostitis and many other ills which afflict humanity and bother the dentist.

H. L. AMBLER, M.D., D.D.S., Cleveland, O.:

(1). On all, where the dentine is sensitive, and also where I wish to extirpate live pulp

(2). With the Wheeler Volt Selecter all cases can be obtunded, either with 25 % cocaine, eucain, guaiacocaine, or electrocaine.

(3). I do not always, because my current is obtained from a plant in the building, and the electrician told me he never changes the current; but before beginning an operation I always test so as to know that the current is flowing through the Selecter.

(4). 110 volt, incandescent lighting.

(5). The current I am using is quite reliable, and I do not find so many wonderful phenomena as some have cited. We

recognize the fact that on a certain day, a patient will bear 30 or 40 volts without discomfort, and at another time 10 or 15 volts will cause some pain, but in such case we obtund. Shock is a thing of the past when using a good instrument and managing it properly. Have used as high as 40, and as low as 4 volts, being successful in each case.

(6). Electrocain will obtund when other medicaments fail.

(7). Cataphoresis will grow in use and success, as dentists obtain proper instruments and gain from reading, demonstrations and experience, the knowledge necessary to make them skilful. It takes considerable time to learn to fill a tooth well, or make a fine piece of prosthetic work, so why not be willing to devote sufficient time and care to using and developing cataphoresis.

H. F. HARVEY, D.D.S., Cleveland, O.:

(1). 10 per cent.

(2). 95 per cent.

(3). Yes.

(4). 113 volt—supplied by plant for lighting building.

(5). Nothing, except that it does the work.

(6). Both cocaine, hydrochlorate and citrate. The latter with alcohol. The stronger the solution the better.

(7). Think it will be permanent in my practice.

G. CARLETON BROWN, D.D.S., Elizabeth, N. J.:

(1). In a comparatively small percentage do I find its use necessary.

(2). I have had very few failures, and these were probably due to complications or defective manipulation.

(3). No.

(4). Street power current.

(5). I have had some surprise in my experiments, but nothing that could not be explained by careful examination and study.

(6). I find that I have better results from the use of a 15% solution of cocaine in electrozone (electrocaine) than any other preparation I have been able to procure; the fact of the extreme conductivity of the solvent being the cause of the rapidity of its action.

(7). I believe that before long a cataphoric apparatus will be as necessary to a progressive dentist's outfit, as a dental engine, but its use is necessarily more limited.

W. W. MOORHEAD, D. D. S., Aledo, Ill.:

(1). It is impossible for me to state the per cent. of patients on which I use cataphoresis. But I always use it whenever I find the dentine hypersensitive, or where I desire to remove the pulp, bleach a tooth, or treat a case of periodontitis. Again, I always use it when operating upon the teeth of young or nervous patients who are having their first dental work done, if there is any sensitiveness, and by so doing relieve their minds in the future from the dread of the dental chair.

(2). While I cannot give the exact per cent. of cases that I have been successful with, yet I feel safe in saying that I have been successful with at least 95 per cent. of the cases.

(3). No. Unless I have occasion to disconnect my battery and selector, I seldom ever test the current for positive or negative.

(4). I have never experienced any phenomena that could not be explained. But I have had some unpleasant experience with it—once when a wire had been burnt out in the selector, and allowed too strong a current to be turned on at one time, and again when the saliva worked its way through the rubber dam, and conducted the current to a metal filling somewhat distant from the cavity being operated on.

(6). Have used Dr. Wm. J. Morton's solution of guaiacocain, but usually depend upon a 25 per cent. solution of cocaine. Recently I have been experimenting with the following formula: Cocain, grs. xii.; aconite extract, grs. v.; soda-bicarb., grs. ii.; aqua-distil., 3 i.

(7). From the beginning of the history of dentistry to the present day, many methods have been devised for obtunding sensitive dentine. Until within the last two years nothing reliable had been discovered, for these reasons: The application of many of these methods caused too much pain, and did not anesthetize the dentine deeply enough to permit a thorough preparation of the cavity; and again, many of these methods not only caused pain, but also injured and destroyed the pulp. When the subject of cataphoresis was brought to our notice, we were inclined to ask these questions: Will it thoroughly anesthetize the dentine, without causing too much pain in making the application? Can it be applied to all cases? Will it injure the pulp? From my experience with it, I will answer the foregoing questions as fol-

lows: 1. It is possible to anesthetize the dentine enough so as to permit the entire preparation of the cavity without causing the patient any pain, either in making the application or preparing the cavity, but if deep anchorage is necessary, it is advisable to make a second application. 2. It can be applied in all cases where the rubber dam can be adjusted, and where proximate fillings are properly insulated. If a clamp is used, it is often advisable to insulate it also. 3. I have been using cataphoresis about ten months, and so far I have never noticed any injurious effect upon the pulp. But I think it is possible to injure it by using too high a degree of voltage. Again, some of the younger members of the profession, and also some of the older ones, in their desire to thoroughly anchor their fillings may encroach too closely upon the pulp, and thus cause trouble. I think when cataphoresis is properly applied it will prove itself to be one of the most valuable agents ever given to the profession of dentistry. It will have a tendency to relieve our patients' minds from the horror and dread of the dental chair, and when they come to us in the future, it will not be with fear and trembling as they have been doing in the past.

E. A. BOGUE, M.D., New York.

(1) In nearly all cases where a large open cavity presents, of whose sensitiveness the patient complains.

(Those cases which most need an obtundent (in my practice,) are those that require the removal of an old filling, or excavation at the cervical margin of a tooth or small proximal cavities difficult of access.)

Cataphoresis is not yet applicable in any of these cases.)

I will say, parenthically, that hot air is applicable in all these three cases and is often very efficient.

(2) All the cases where cataphoresis is used by me are successful, unless it be the dense yellow teeth of adults passed middle age.

(3) Never use the street current, so there is no question about positive and negative poles.

(4) Dry cell, constant current.

(5) Have experienced one, to me, unexplainable phenomenon, viz: that the patient experienced considerable pain during the 24 or 36 hours following an operation made painless by cataphoresis. Have not had any unusual incident. The incident just mentioned is the usual thing, though not usually spoken of.

(6) Nearly saturated solution of cocaine and from that to a 20 per cent. solution. No experience with other medicines have been recorded.

(7) A speedy disuse unless some more rapid and efficient method of employment is discovered.

It will maintain its place as a plaything until the grown up child gets tired of it.

F. T. VAN WOERT, M.D.S., Brooklyn, N. Y.

(1) About ten per cent.

(2) Ninety-nine per cent.

(3) I do not, because the instrument I am using is so constructed makes it unnecessary.

(4) The galvanic current generated from twenty mesco dry cells.

(5) There are several phenomena noticeable in the diffusion of medicaments into the teeth by means of a galvanic current, but so far have seen none that were not explainable, for instance, if the potential is too high the milli-ampere meter will show a lower reading in many cases, and when the E. M. F. is decreased say  $\frac{1}{2}$  to  $\frac{2}{3}$ , the milli-ampere meter will show an increase in current, sometimes nearly twice the amount, this is contrary to electrical science, yet the explanation is very simple, which is as follows: the galvanic current when applied to soft tissues, or the fluids of the body, causes a contraction or coagulation, the extent of which depends upon the amount of force employed, this force being measured in volts, and is the pressure of the current. Now when the pressure is sufficiently high to increase the resistance by this contraction and coagulation, the amount of current passing through is diminished very much, understanding of course, that a relaxation takes place. If the application of the current is continuous, if is not before the medicament used, has become dammed upon the surface, sufficiently to maintain a very much higher resistance, than the normal; and in all such cases considerable more time is required to obtain satisfactory results, than where the electro-motive force is only sufficient to carry with the current the medicaments employed. That there is an electro pathological condition, must be evident to all, who have made this matter a study. The severity of this electrical disease is dependent entirely upon the manipulation of the current by the operator.

(7) I use the saturated solution of cocaine, which I had made a short time ago by Parke, Davis & Co., some pellets of absorbent cotton, varying in size, and these pellets containing, some 1-5 and 1-10 of a grain of pure cocaine salts, so that when I am ready for operation, I have simply to take one of the pellets of a suitable size, place it in the cavity and moisten it by means of a small drop-tube, and proceed in the usual manner. This gives me a fixed dosage, which seems to me a matter of jurisprudence, if nothing more. This idea belongs to Dr. F. Peterson, of New York, as will probably be announced by Messrs. Parke, Davis &

Co., when they place their goods on the market. For absorbing abscesses, relief of peridental inflammation of all kinds, I use a 25 per cent. to 50 per cent. of aqueous solution of tincture of iodin. In cases of chronic abscess the chlorid of zinc has proven of great value. I have several other preparations which I hardly dare to announce, because of insufficient data, to prove my theory as to their virtue.

(7) I am of the opinion that the diffusion of medicaments, by the means of the galvanic current, has become a prominent system in our profession, unless the parties who are using the street current for this purpose, should be unfortunate enough to have a serious accident happen, which is liable to occur at any time. In such an event the public and the profession would become thoroughly frightened, and for a time at least, the method would be abandoned. That the street current is unreliable and dangerous, is beyond a question of doubt, true. If any member questions this, they would do well to communicate with the authority given below, which is recognized as the most reliable in the world:

Prof. Henry Morton, Stevens Institute, Hoboken, N. J.

Prof. Thomas A. Edison, Orange, N. J.

E. P. Thompson, M. E. and Prof. Wm. A. Anthony, 5 Bookman-st. N. Y.

Mr. Nichola Tesla, 46-48 E. Houston-st., New York.

Dr. F. Peterson, 50 West 50th-st., New York.

Mr. N. W. Perry, Editor of *Electricity*, 136 Liberty-st, New York.

Messrs, Houston & Kennelly, Electrical Experts, 1105, 1106 Betz Building, Philadelphia.

Editor of the *Electrical World*, 253 Broadway, New York.

I have had letters from all these gentlemen, claiming that street current is dangerous. Will publish full particulars in a later number of one of the journals.

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### Bleaching Teeth by Means of Sodium Peroxid Applied Cataphorically.\*

BY HENRY BARNES, M.D., CLEVELAND, O.

THE case presenting was a right superior central incisor badly discolored. The root canal had been filled about two-thirds of its length.

The process of bleaching was carried on as follows:

A quantity of sodium peroxid, in powdered form, was placed within the pulp cavity and the unfilled portion of the root-canal. The positive electrode was then applied and the contents of the cavity moistened with

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\* Clinic given at the Ohio State Dental Society, Columbus, Dec., 1896.

water. In this case the voltage was carried as high as eighty, indicated on the dial, and the current was continued for from ten to fifteen minutes altogether. The cavity was next filled with a ten per cent. solution of hydrochloric acid, to neutralize the sodium peroxid, then rinsed with bicarbonate of soda solution to neutralize the acid. The cavity was then lined with paraffined white wax, and filled with cement. The result was very satisfactory.

### Questions and Suggestions.

1. WHY is a tooth after removing an amalgam filling, so sensitive to the application of cataphoresis?
2. If the enamel is a non-conductor, why is it necessary to insulate a tooth that has already one or more fillings, and in what way does the current reach the filling?

*Insulating.*—I have found for insulating where a filling approximates a cavity, nothing better than a narrow strip of rubber dam tied around the tooth containing the filling.

*Attachment for Mouth Lamp.*—An Edison plug used in place of one of the lamps on the Custer appliance, makes a splendid attachment for a miniature mouth-lamp.

DR. E. C. BEGGS, Mt. Vernon, O.

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### EDITOR'S NOTES.

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#### An Electrical Number.

WE have the pleasure of presenting our readers, in this issue, 72 pages of valuable material pertaining to the use of electricity in dentistry, particularly cataphoresis. The subject of cataphoresis has been much studied during the past year, and while progress has been made through experimentation, there are still many things not yet well understood. While much has been accomplished, it has been by a limited few, and the mass of the profession have been holding back to learn the results of these investigators before attempting the use of electricity in their own offices.

In this issue we give the most valuable collection of original

matter, pertaining to cataphoresis, etc., yet presented in one issue of any dental journal published. It is material that will bear careful study, and will be found very reliable, coming as it does from men who have made the subject of electricity a special study. We, therefore, ask our readers to peruse and digest the contents of every page of this issue if they desire to keep posted in the use of electricity as applied in dentistry.

On account of making this a strictly electrical number, we have been obliged to hold over much valuable material that should have appeared this month, but which will be published in the March issue.

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### New Publications.

**ARTIFICIAL ANESTHESIA.** A Manual of Anesthetic Agents and their employment in the treatment of disease. By Laurence Turnbull, M. D., Ph. G., Aural Surgeon to the Jefferson Medical College Hospital, Philadelphia; etc. Fourth edition, revised and enlarged. Philadelphia, F. Blakiston, Son & Co., Publishers, 1896. Price, cloth, \$2.50.

Thoroughly up to date and better than ever, seems a fitting expression for this new edition of Turnbull's Anesthesia. It has for years been looked upon as a leading treatise on this subject and this revised edition will certainly keep it in the lead for some time to come.

Many of our readers are probably acquainted with the work, but for the benefit of those who are not, we will say that the subject has been thoroughly presented. Not along certain special lines, and with perhaps only certain anesthetics, but all the worthy anesthetics, both general and local, from chloroform to eucain, have been fully considered.

The book opens with a history of ancient and modern anesthesia, theories in which anesthetics produce their effects, etc. The subject of Nitrous Oxid, is then taken up and nearly one hundred pages devoted to its consideration.

Alcohol, ethers, ethyls, mixed anesthetics, chloroform, etc., etc., receive due attention. More than one hundred pages are devoted to local anesthesia and anesthetics.

The book is well illustrated, printed and bound, and the practitioner, be he either dentist or physician, who purchases the work will get many times value received. We highly recommend it to all.

**ELECTRO-THERAPEUTICAL PRACTICE.** A ready reference guide for Physicians in the Use of Electricity. By Charles S. Neiswanger, Ph. G., Professor of Electro-Physics, Post Graduate Medical School of Chicago, Author of Electro-Therapeutics, etc. Chicago: E. H. Colgrove & Co., Pub. For sale by the McIntosh Battery and Optical Co., Chicago. Price, cloth, \$1.25.

Here is something unique in the way of a small guide to electro-therapeutical practice. No theories have been advanced, and no pathology given, simply plain facts and simple rules for the guidance of the great mass of practitioners who, says the author, it is supposed, have learned theory and pathology from their text-books, but desire to use electricity in their practice principally as an adjunct to other therapeutic agents. All superfluous language has been eliminated, and the matter concisely presented. For instance on page 40:—

**Neuralgia.** Galvanism, Cataphoresis. No. 2 with sponge saturated with chloroform, attached to positive pole, is applied to lesion. No. 3 on negative to some indifferent point, 10 to 12 ma. for 3 to 5 minutes. N. B. Care should be taken not to apply current too long, as vesication may result.

**"Trigeminal.** Galvanism, No. 1 on positive over lesion. No. 3 on negative over upper cervical vertebrae. 5 ma. for five minutes two or three times daily," etc.

Various other ailments are treated after this manner and the diseases are arranged alphabetically. The book contains 80 pages, is interleaved for additional notes and neatly bound in flexible cover.

## BRIEFS.

**Cause of Failure** in cataphoresis is more often attributable to faulty manipulation than to the appliance used or condition of patient. Watch yourself.

**Do Not Use a Brass Electrode.**—In using cataphoresis, particularly where there is a live pulp in the tooth operated upon, never use an electrode made from brass, as this metal contains arsenic, which is liable to cause death of the pulp.

**A Good deal in Knowing How.**—With cataphoresis as with cocaine or any other pain obtunder, a heap depends upon the man who uses it. I remember very well when our first pain obtunders were introduced, nine-tenths made a failure.—*H. O. Larrabee, Review.*

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## CONTRIBUTIONS.

### Some Established Principles in Prosthetic Dentistry.

BY L. P. HASKELL, CHICAGO.

THE world is full of theories, and if they could all be verified by facts of actual experience doubtless great advantage would result, but the great mass of these are vagaries of the brain, or if true are of little importance.

It has seemed to me that dentistry has had more than its share of unproved theories, advocated with great pertinacity, even though worthless. But one ounce of facts is worth more than a pound of theory.

Then some of our younger writers and teachers seem unable to get out of the old ruts, so that recent text books for the instruction of beginners are burdened with theories and methods which are or ought to be obsolete.

Instead of simplifying methods in accordance with the progress of events, they are made, if anything, more difficult to comprehend, "multiplying words without knowledge."

There are some principles and methods in prosthetic dentistry at once simple and so thoroughly verified by long experience, they ought to be kept before the profession.

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## PLASTER IMPRESSIONS.

The more difficult the case of which to obtain an impression, the greater the necessity for using plaster.

## AN INVARIABLE RULE.

In all cases where the cuspid teeth have been extracted a year there is necessity for, and room for wearing the plate higher, and the artificial gum fuller, than elsewhere, in order to restore the contour of lip.

## VACUUM CAVITIES.

In full cases, upper permanent, there is no need of air-chambers or vacuum cavities, except in rare instances. This is asserted after thirty years non-use of them, having had every conceivable shape and condition of jaws to deal with, and in the heaviest continuous gum sets. Often they interfere with suction. In this connection it should be considered that the center of the palate is hard and the only portion of the upper jaw that never changes from absorption or pressure. As the alveolar ridge is constantly liable to more or less change (especially true under rubber,) sooner or later the plate is resting and rocking on this hard center. In metal plates, a thin "relief" of wax, the edges flush with the model, is needed in all cases, except in less than one per cent, where it is soft, and no change whatever is needed. This has been my invariable practice for thirty years, and the results are eminently satisfactory.

## DIE METAL.

Nothing has so simplified the fitting of metal plates as the use of Babbitt metal properly made. It would seem as though the exclusive use of this metal for 45 years, after having used everything else ever used, would establish this fact. One writer in a recent work objects to it on account of expense. Five pounds costing \$2.50 would last an ordinary practice a year. Babbitt metal is sufficiently hard and tough for all cases. If it cracks it shows a lack of tin, the addition of a little will remedy it. The proper formula is copper 1 part, antimony 2 parts, tin 8 parts, to be melted in the order named, otherwise the tin will oxidize more or less in mixing.

As pure lead cannot be poured upon Babbitt metal the melting temperature of the lead is reduced by adding one-sixth tin,

and as lead is too soft for the counter die, the tin hardens it. The die and counter-die should never be of the same metal, as neither will yield, and the softer metal (the plate) will be torn, or made very thin at prominent points, and their use is unnecessary. A second die of Babbitt metal is seldom needed, and a second counter never.

#### OILED SAND.

Its advantages are two-fold, viz: when once prepared it can be used many times without re-oiling, thus saving time and annoyance. When moistened with water if too wet or packed so hard the steam cannot escape, blow-holes are liable in the die. This never occurs with oiled sand. It should never be used with zinc, as that is poured so hot it burns the sand too much. To the objections sometimes made to the "odor and soiling the hands," it may be suggested that these are discounted by the opening and handling of a vulcanite flask.

#### MOULDING FLASKS.

The Bailey moulding flasks are totally unfit for the purpose, too small and too flaring. More room is needed to pack conveniently. Have them made of heavy sheet iron, 3 in. deep and 4 in. diameter.

#### THE USE OF THE BLOW-PIPE.

It is strange, but true, that the blow-pipes furnished the dental profession from the earliest days to the present are simply jewelers' blow-pipes, and totally unfit for dentists' use.

The jeweler uses low grade solders, and has no investment to contend with. The pipe is so small it has to be taken inside the lips, tiring the muscles.

The dentist with his high grade solders and heavy investments needs a large blow-pipe the mouth of which is pressed against the lips, so that the blowing is made easy; then with the larger orifice at the heat end a larger flame can be secured. Years ago in Boston I had a mandrel made on which I made such a blow-pipe for the profession. In later years the dental goods dealers have at my request made such a blow-pipe which they have named the "Haskell."

I have found in teaching students they could learn easily the use of the mouth blow-pipe, and succeed better as beginners in metal work than with the automatic.

## VULCANIZED RUBBER.

The most serious objections to the use of rubber for full *upper* dentures is its non-conductibility ; the retention of undue heat, causing constant change in the process, so that in thousands of cases there is no ridge left, or only a ridge of thickened membrane. Dr. George Watt's theory was that the retention of undue heat did not cause additional absorption, but what was practically the same in results, prevented a re-placement of lost tissue.

## REPAIRING OF RUBBER PLATES.

The old method of repairing by means of dove-tails, holes and solutions has long since been discarded by progressive workmen, and in their stead a simpler method pursued. If a broken plate, fasten the parts together with wax, and fill the plate with plaster ; if a missing tooth, wax one in place and flask only one-half of flask. In both cases remove wax and clean the plate ; in the broken plate cut away a portion of fracture, thinning the edges for a distance of  $\frac{1}{4}$  inch or more, leaving at extreme margin a depression of 1.32 inch. With a *hot* spatula press fresh rubber on to the surface and fill to the desired fullness, flask and vulcanize, and the union will be found perfect. In the replacing of the tooth use the hot spatula, and finish flasking.

## ALUMINUM FOR PLATES.

This makes an excellent cheap plate. To the objection sometimes made that it is acted upon by a caustic solution of soda and is therefore unfit for use in the mouth, it might be said that the oral cavity does not contain a "caustic solution of soda" nor anything else that will deteriorate the metal. I have never seen the first evidence of such action in any plate after several year's use. As formerly reduced the metal contained little specs of iron which rusted and holes resulted. The present metal is entirely free from any impurities. By the use of the "loop-punch" the rubber is firmly held to the plate.

## THE ARTICULATION OF TEETH.

There are more failures from faulty articulation than any other cause.

The six anterior teeth should never come in contact, resulting

as it does in crowding the upper plate forward and down at the back.

Pressure should be exact on both sides on bicuspids and first molars.

If a lower, second or third molar is an inclined plane, do not allow the upper molar to come into close contact.

#### CONTINUOUS GUM WORK.

This work, after nearly 50 years' use, has no peer as a full dentine. Nothing ever made approaches it as the strongest, most desirable, most natural in appearance, most healthy to the oral tissues and the most cleanly, *when properly made*.

The matter of *weight* cuts no figure, except in rare cases.

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#### A Defence of Theory.\*

BY J. S. CASSIDY, M.D., D.D.S., COVINGTON, KY.

THE object of this paper is to enter a mild protest against the habit we have acquired during the last few years, of condemning all ideas not proven as true by actual experiment, and not for the purpose of suggesting anything of either a scientific or practical nature.

To introduce such an unorthodox text, to such a body as this, is presuming a good deal; no one can realize how much until he finds himself in this position, but when one is constantly surrounded by an inelastic atmosphere of science, and affected as we all are by the grinding monotony of daily practice, a departure from the usual routine may not be inexcusable.

How often, alas, we have heard and read the ungrateful expression, "Give us more of the useful, and less of these fine spun theories." At the same time, he who occasionally ventures to disobey this injunction, is probably far more practical in his daily life than are his critics, and of this fact he is usually proud; indeed, it seems that we resent the imputation as though it were a stigma, of being too visionary rather than too practical. To use the oft-repeated words of Mr. Venus, in "Our Mutual Friend"

\* Read at Ohio State Dental Society, Columbus, Dec., 1896.

—"She did not wish to so regard herself, nor yet to be so regarded." Any statement that you do not endorse, falls to the ground as unworthy of respect, if you only say "it is a mere theory;" but a good thought is never lost, for truth is eternal. Imagination is the offspring of intelligence, and imagination, guided by philosophy, develops thoughts, which control the evolution of theories that in time result in practical application, and, on the other hand, explain the existence of well-known phenomena by processes of reasoning admittedly correct. A long time may elapse from the setting forth of an idea and the verification of its value.

Columbus—the man—evidently struggled with his so-called vagaries a long time before a few friends were found to believe in him, and able to furnish him with means to consummate his tremendous project of either finding a new route to the Indies, or of introducing a new world to the old; whereby we are granted the privilege of meeting pleasantly together on this occasion in this beautiful city, named in his honor.

At the time that Franklin dreamed of the lightning and discovered its identity, circumstances were not such as to demand the uses to which it is put today. Perpetual motion, undoubtedly a fanciful figment of unbalanced minds, is nevertheless practically at work by the everflowing waters of Niagara; and who indeed can laugh at any one who says the future will witness the winds and waters of the earth judiciously harnessed, thus supplying heat and light, and power illimitable?

Again, there may be a persistent demand for something needed, as with anesthesia, which from time immemorial was hoped for, and although the means for which were pointed out by Davy, in his original description of  $N_2O$ , the idea remained in abeyance for nearly forty years, until Wells realized and put in practice the blessed inspiration. The atomic theory of Dalton marked the birth of chemistry as a science; albeit the art has been practiced even from the time of Tubal Cain. This theory of Dalton has been essentially improved and accepted by all, and yet it is not proven as absolutely correct. It is a means to an end, correctly solving the problem of chemical affinities, and the mathematical molecular construction of the most complex substances.

When Lavoisier put forth his theory of ordinary combustion,

and described the important part which he believed the newly discovered element, oxygen, played in the field of natural phenomena, his views received little encouragement until Faraday proved in detail and beyond question, the nature of this wonderful reaction. If no other useful outcome could be traced to Lavoisier's theory than the oxy-hydrogen flame, such an example should be sufficient to render modern scoffers of embryonic thought, less skeptical in their opinions.

Was not the clear cut theory of Watt, which held that dental decay was caused by chemical agents, produced only at the point of injury, by a process *now* known as fermentation, a logical antecedent of Miller's experiments in that direction? Did not Miller theorize as to the genesis of this disease, long before he produced artificially one of its varieties?

The imagination of Crookes, when he discovered radiant matter—the fourth state—about twenty years ago, conjured up the possibility of it being the border land between material and spiritual entities; who can say that his was a spurious speculation in the light of what has already been accomplished by the Roentgen Ray?

We are a profession of neither realists nor idealists, but a happy combination of the two, and as such, we are still, notwithstanding all our progress, unsatisfied with the materials we use for filling teeth. There is probably not one of us who has not devoted more or less serious thought to the coming ideal. Its coming sometime is surely not a "will o' the wisp" of the imagination, but even if so it be, is it proper to discourage theorizing on such a subject?

Perhaps it is so, that life is too short, too full of passing duties, for the average dentist to devote much time to the consideration of questions belonging exclusively to pure science. Enough possibly for him to know is that certain causes will produce certain results; that for instance, a certain base will neutralize a certain acid, resulting in the formation of a new body, which he knows in advance will possess certain properties; but why really it should be colorless, or blue, or yellow, or hard, or soft, are questions too trivial to engage his attention. Nevertheless, the minds of the best thinkers of today are tending to go beyond those evident causes and effects appreciable to our senses; to the very depths of ultimate knowledge in the limitations of matter.

This fact obtains more especially among those who know something of human physiology and pathology, whose life work it is to combat disease. They assume that both metabolism and catabolism are processes of molecular and therefore atomic interchange; and thus also with disease. The physical degeneration of a part, even though it be but temporary, whatever the cause, must proceed molecularly, and its restoration to health is governed by a similar process.

Where the part is permanently destroyed, as in dental caries, the lost portion must be restored by artificial means. Shall we consider a theory as mere "poppycock" which holds that absolutely successful therapeutics, in such cases, will be the ideal filling, like in molecular motion with respect to heat, like in color, like in hardness to the enamel itself, builded up molecule by molecule, through the influence of electrolyses or whatever the method may be named. It is by the inherent properties of molecules only, in forming the mass, that we recognize matter in its various aspects; and if we are to keep in touch with the trend of therapeutics, and learn to know more of the nature of matter as we find it, we will be compelled to appeal more and more to our imagination in order to have a definite conception of molecules; at least their individual construction by the chemical union of a given number and kind of atoms, and how these atoms, in homogeneous molecules, are similarly arranged.

We do not claim that theory is science, for it may be true or false, and often is unfortunately when shorn to nakedness, devoid of the elements of truth; but nevertheless each new discovery marking the ascent of man to a higher civilization, was preceded by investigations governed by theories; and so it will be in the future. Theories, like the springs of running water which fructify the earth, should not be dammed without good reason. They have not been and will not be hereafter, to quote one of your profane *and* respected governors, when referring to the proposed resumption of specie payment—"a d——d barren ideality.

## Hints on Plate Work.\*

BY W. BUZZELL, D.D.S., PT. CLINTON, O.

WHILE it will no doubt seem commonplace and perhaps superfluous to most of you, yet if what I may say should contain any suggestion of use to any one, it will be worth the self-denial you may exercise in listening to my paper, which by way of encouragement I promise will be short.

### THE IMPRESSION.

I always take impressions of full cases in plaster, enlarging the imprints of the (rugae) with a small oval scraper—Wilson's No. 1 is convenient—and if there is a hard ridge along the median line of the palate, the impression should be scraped a little here also.

Allow the impression to dry and varnish, or rather stain with thin shellac. Spread a thin film of wax along the edge of the impression, and soak for two or three minutes in a solution of soap. Just before pouring wash off the soap with a dash of cold water. Allow the cast to dry well, then immerse for a minute or two in boiling water, and the impression can easily be broken from the cast.

By the way, the easiest method of cleaning plaster bowls is to allow them to dry and then turn boiling water into them. To save time one should have several of them at hand.

### TAKING THE BITE,

is the next thing in order. Make trial plates of modelling composition, which when cold is sufficiently rigid to handle without being distorted. On each make a ridge of wax to represent the line of the teeth. Try in the mouth and with a warm knife carve them to proper contour and length of bite, and until they close fairly in the mouth.

Now comes the only difficulty. If you tell the patient to "close naturally," he may do so, or almost any other way. By making trial plates as I have described, the dentist gets the matter into his own hands. By repeated trials in any or all of the

\* Read at Northern Ohio Dental Society, Cleveland, 1896.

usual methods, he can determine the correct bite and identify it at any time in or out of the mouth. I usually ask him to bring his molars squarely together, both sides alike, then swallow, in doing which one unconsciously brings the jaws into their proper relation, at the same time keeping the head well back which puts the depressor muscles on a stretch and resists the tendency to protrude the lower jaw.

Having determined what is the correct bite, with the jaw properly closed, mark the median line and other points, so that the trial plates can be readily adjusted; or skewer them together with pins, or fuse them together with a hot spatula; and remove.

If the case is one requiring only one plate, the mode of proceeding is slightly modified. Suppose we have the most common case—an upper plate to be made; the lower teeth being present. Make a trial plate of modelling composition as before, but instead of a wax ridge, make it of modelling composition, carving as before until it fairly represents the proposed line of teeth, leaving the occluding surface rather broad. Determine the correct bite as before and mark with a pointed instrument where the lower teeth touch the trial plate; or have the patient mark it by setting his teeth into it a little, so that the true bite can be readily recognized.

Now fix a roll of soft wax on the ridge, and have the patient close his teeth as before through the wax until they rest on the trial plate. Before allowing him to open, part the wax in front and see if the bite is correct as previously determined. If so, press the wax back into place and remove, and you will have an impression of the lower teeth in their correct relation to the upper jaw.

By this mode of proceeding the errors due to the patient's misunderstanding, are entirely eliminated and the matter is made to depend only on the dentist's skill and judgment.

#### MODELLING THE PLATE.

In mounting the teeth I use beeswax rolled into sheets, and make the wax model represent as accurately as possible the finished plate. Make the surface of the wax smooth with blowpipe flame, and when cold polish with light and rapid strokes with the dry finger. Varnish the wax with thin shellac, but do not daub the teeth, and when dry flask as usual.

The reason for varnishing the wax model is as follows: If plaster is poured on the wax surface, minute air bubbles adhere to the wax and the result is a rough plate. The varnished surface wets more easily and obviates the trouble. A smooth mould is made and the surface of the plate is so smooth that no scraping is necessary, only scouring with felt wheel and pumice, and polishing in the usual way. Varnishing the model also prevents the wax from sticking to the mould, so that it is much more easily removed.

#### PINK RUBBER FACING.

I have seen many plates with the entire front rim made of pink rubber. Now pink rubber is not tough enough to be used in this way and when rims are so made, unless very thick, they are almost sure to break.

When used it should be only a facing—the thinnest possible veneer, extending about two lines above the teeth and in the interdental spaces, and no more should be put in than is necessary to this result.

As remarked before, the wax model should accurately represent the finished plate, leaving nothing to be done with files and scrapers, except to trim the edges. Care should be taken that the wax model is everywhere in contact with the cast, leaving no vacant space beneath it. Invest the case in the bottom of the flask, leaving exposed the teeth and just as much of the front of the wax model as is to be faced with pink rubber; as the line of separation determines the margin of the pink facing. Finish investing, taking care to avoid air bubbles, especially where the pink facing is to be placed. This is much more easily done if the model has been varnished as suggested above. Separate the flask, remove all the wax and weigh it.

Every dentist should have a sufficiently delicate balance and a set of Troy or metric weights, from 1 dgm. to 20 gm.

Cut waste gates only in the rear of the mould, but cut a groove around the mould to receive any surplus that might be forced out and prevent the flask from closing; but no gates communicating with that part of the mould where pink rubber is to be placed. Wash out all traces of wax with boiling water, for purpose a syringe is useful.

## PACKING THE RUBBER.

Cut V shaped pieces of pink rubber and pack into the spaces between the necks of the teeth, and small narrow pieces—say half a line in width—pack over the necks of the teeth. Cut a strip for facing wide enough to extend from the edge of the mould to the necks of the teeth or slightly over them, taking care that no space is left uncovered with pink rubber around the teeth for the dark plate rubber to come through and disfigure the work. Pack the plate rubber, distributing it as judiciously as possible. The groove left in the other half of the mould by the upper edge of the rim, should be packed *full* of plate rubber.

Enough rubber should be used to fill the mould with as little excess as possible, and the flask when once closed must not be opened, as the pink rubber would be displaced and the work disfigured. So the proper amount should be put in before closing.

To ascertain the amount necessary, multiply the weight of the wax model by 1.7. A small piece—say 3 or 4 grs. (2 or 3 dgm.) may be added to guard against deficiency. Here I wish to repeat the caution made a little way back. Be sure there is no vacant space under the wax model, for it would probably result in a vacant space in the plate.

In closing the flask, bring the front together first, forcing any excess out at the back, and thus avoid displacing the pink facing.

## AIR CHAMBERS,

I consider useless or worse than useless. I haven't used one in ten years. I have, however, used Spyer's forms in many plates, both upper and lower, and I think adhesion is improved by their use.

Having vulcanized the case, turn the edges with the file, scour with felt wheel and pumice and polish. No scraping or sand papering should be necessary.

To trim around the necks of the teeth use a No. 2 Wilson scraper. Follow with wood or cork points with the dental engine.

If the work has been carefully done, the pink rubber produces its best possible effect with the least possible weakening of the plate, being in the form of a thin veneer which will not scale off.

In conclusion I wish to say that I am not under the delusion

that I have offered anything heretofore unknown. But if any one should find his labors lightened by any suggestion that I have offered, I shall be amply repaid, and your time will not have been taken in vain.

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## Dental Operations During Pregnancy.\*

BY H. J. CUSTER, B.L., D.D.S., M.D., JOHNSTOWN, O.

SEVERAL years ago a young married lady of lymphatic temperament presented herself in order to have a superior lateral incisor filled with gold prior to making a visit. Nothing was said regarding her condition, but circumstances indicated the first weeks of pregnancy and a cement filling was accordingly advised.

The patient insisted upon a gold filling, which was finally agreed upon. The cutting of the sensitive dentine apparently caused but little pain; in fact, the several steps of the operation were accomplished with but little discomfort until a finishing strip was introduced, when the first and only rasp caused a momentary muscular paroxysm. After a few moments interval the filling was completed by the aid of disks and the lady left the office without much depression and well satisfied with the operation. However, the second day after the operation, uterine contractions were established and after several days of rather serious illness an abortion of about the tenth week was completed, while the visit was postponed and the topic of this paper sufficiently stamped upon the mind of the reader to culminate in the present article.

That very serious results do sometimes follow dental operations during the period of gestation is evidenced by the best authorities and by detailed reports of such occurrences. But, after investigating the literature upon the subject it seems that the dangers of this period are not generally comprehended, for, nearly all the reported cases show abortion to have occurred very soon after dental irritation; and, secondly, a number of practitioners testify that they have practiced many years and never knew any trouble to follow; which, while the dentist is perfectly conscientious, would seem to imply that an abortion must follow

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\* Paper read at Ohio State Dental Society, Columbus, December, 1896.

soon after operation, while the following would seem to indicate that detrimental influences to the foetus, or an abortion may follow weeks or even months later as a result of irritation and the dentist lose sight of the case.

In the first place reliable gynecologists conservatively say that at least 70 per cent. of all adult females are afflicted with some disease or diseases of one or more of the generative organs. Consequently there is a very prevalent predisposition to abortion.

Further investigation shows that nervous reflexes dependent upon diseases of the generative organs frequently aggravate and may cause insanity. Conversely, eminent psychologists testify that nervous and mental diseases often seriously interfere with the functions of the reproductive system, while amenorrhoea and premature expulsion of the uterine contents as a result of prolonged anxiety, fright, pain, grief, or strong mental emotion are not uncommonly reported, and there are many abortions other than criminal, whose occurrence is shielded from public notoriety. Hegel reports "One abortion for every eight or ten full term deliveries."

Women who have a diseased uterus, ovaries, tubes, or a pelvic cellulitis complain of neuralgic pains, which frequently find expression in the trigeminus. Gestation is often accompanied by toothache, while the pains of parturition have been known to alternate with pain in the teeth.

Pregnancy, which primarily is a physiological condition, on account of the prevalence of pelvic disease often assumes more or less of a pathological nature, and during disease the reflexes are especially liable to be perverted and irregular.

From the foregoing clinical observations it would appear that the reproductive organs maintain such intimate communication with other regions and are so susceptible to reflexes that it is necessary to press the button but slightly in the region of the trigeminus and precipitate a calamity of no inconsiderable proportions.

Having briefly considered the possible tendencies of dental irritation, let us now inquire into their relation to the causes of abortion.

According to Lusk, "The underlying causes of abortion, miscarriage and premature delivery are the same. Causes of abortion are rarely of sudden occurrence. Usually the way is pre-

pared either by changes occurring in the ovum or by certain pathological conditions affecting the mother. In either of these ways a disposition to abortion is produced. When once, as a result of morbid changes, the attachment of the ovum to the uterus has been rendered insecure, causes usually inoperative suffice to determine uterine contractions and the time at which the expulsion occurs."

'The disposition to abortion may be due primarily to any disease of the chorion, such as syphilitic degeneration of the villi. In most cases, however, death of the foetus precedes and leads to disease of the chorion.' Therefore the causes of abortion are in large measure causes which produce death of the foetus, which having occurred, is followed by expulsion of the ovum, not usually at once, but after a longer or shorter period of time.

'There is also a class of women in whom there is neither disease of the ovum or of the genital organs and yet pregnancy is interrupted, according to present information, from certain personal conditions of nerve irritability. Psychical and physical excitement which would be of small moment in some women, in them sufficient to empty the uterus.'

Recalling the percentage of women with pelvic trouble and consequently more or less predisposition to abort, the exciting causes should now specially interest us. There is, first *hyperemia of the gravid uterus*. When predisposing causes have weakened the attachment of the ovum to the decidua, *anything* which determines the blood currents to the uterus is liable to produce extravasations of blood around the ovum and awaken uterine contractions, the contents usually being expelled at an early date; or, the hemorrhage may be intra-placental, or into the serotina, or into the uterine sinuses. The extravasated blood usually undergoes the ordinary metamorphosis and the pressure upon the villi produced by the extravasations impairs the nutrition of the foetus and may cause its death, in which instance the expulsion might occur weeks after the exciting cause has operated.

As a second exciting cause, there may be uterine contraction produced by influences which act directly through the nerves; such as are produced by powerful mental emotions. The results of this process are usually soon apparent. However, the contractions may not be sufficient to cause a final result at once. The ovum may change position within the uterus

and the abortion be incomplete. Or, again the blood extravasated around the ovum or into the tissues may not bring the case to a final issue for weeks or even months.

*Circulatory disturbances and muscular contractions* with the possibility of detrimental trophic changes are then conditions to be especially avoided during pregnancy. As dentists we may unintentionally and indeed unavoidably produce the two former and perhaps the latter conditions as a result of *shock*. The reflexes of either physical or mental shock may stimulate the uterus to contraction and probably this cause is responsible for most cases of immediate abortion, or those for which we may be held responsible.

Investigating the pathology of shock, we find that one condition, though not a constant one, is *an engorgement of the abdominal veins from vaso-motor paralysis*. As before shown, this condition is very dangerous to the gravid uterus and the ultimate results may occur early or be obscured by the future.

Shock as most often seen by the dentist is of the immediate variety and frequently observed before the patient leaves the chair.

But there is another variety, an insidious form of shock in which the symptoms appear rather late and are out of all proportion to the gravity of the injury. The patient may leave the office apparently calm and unaffected; may have a good color; quiet pulse and respiration; and nothing appear wrong. But a little later insomnia develops; the pulse becomes soft, quick and rapid; there may be chills followed by fever; and the depression may last for days and weeks, perhaps only to terminate in some nervous disorder.

Several times during hospital experience I have witnessed this form of shock and have had the opportunity of observing every detail of two such cases occurring in my own practice. Fortunately both cases were only moderately severe and occurred in young unmarried ladies. These cases of latent shock or depression sometimes occur unknown to the dentist and cannot prove other than very injurious during gestation. Besides the liability to circulatory changes and uterine contractions, since the nervous irritability is long continued, there is no evidence contradicting a *trophic disturbance*, especially in a process so entirely dependent upon nutrition while present but meager information

would rather confirm the theory. We may also add that the accompanying fever can in no way contribute to the welfare of either mother or child.

There now remain for consideration *the several reflexes unassociated with shock*. When the trigeminus is irritated, even in health, there is no telling whether any decided reflex will be instituted, or, if any, whether it will be secretory, muscular, vaso-motor, or possibly trophic. Or, perhaps all the reflexes may operate more or less at the same time. Of these reflexes that of *muscular contraction* is much to be feared; the results being the same as uterine contraction from shock. And, it is well worth remembering that nerve centers have the power of augmentation of reflexes and that reflex muscular contractions are more sustained than those produced by direct stimulus of muscular nerves. Thus a blow upon the abdomen might cause a gravid uterus to contract but momentarily, while a stimulus to a nerve center through a centripetal nerve may excite reflex contractions lasting some time after cessation of stimulus.

Vaso-motor reflexes may produce either dilatation or constriction of the vessels. If the constrictor reflex were but transient the resulting anæmia would probably cause no serious disturbance, while the hyperæmia of a dilator reflex would be attended with the same dangers previously described under shock.

Regarding the management of these cases, it would seem well to avoid operations during the third, fourth and eighth months of pregnancy and also during those periods when menstruation would ordinarily occur, for, according to Spiegelberg, these periods are especially risky.

The common method of palliative treatment and temporary fillings will dispose of a larger number. But, there are some cases of difficult cavities with exposed pulps, phagedenic pericementitis, abscess, impacted third molars and possibly other complications where non-interference might produce the very results which we are so anxious to avoid.

Cataphoresis and other obtunding agents and the careful approach and manipulation of the dentist all exercise an exceedingly beneficial influence, but the mind still remains active and susceptible, and the nerve centers on the alert for reflexes. Something is needed to diminish both mental and physical nervous susceptibility. The combination of whiskey and morphine as

mentioned by Dr. Marshall is an excellent agent to administer, but so many ladies are so prejudiced against alcoholics that they will refuse them but at the same time accept other poisons in proportionately larger doses.

Antikamnia, or preferably antikamnia and condein are good preparations as also are migraine tablets composed of acetanilido monobromated camphor and citrate of caffoine. A full dose of chlorodyne just before operating produces good results. All of these agents reduce the sensibility to pain and give ease to the mind.

But the one remedy which I have used most frequently during the last two years is "BROMIDIA," of which each fluid drachm contains 15 grs. each of chloral hydrate and potassium bromide and one eighth gr. each of ex. cannabis indica and hyoscyamus. This preparation lowers the activity of the nervo-muscular apparatus which controls uterine contractions; and being hypnotic, antispasmodic, analgesic and anæsthetic, it diminishes both physical and mental reflex activity and also produces a pleasing mental condition.

Chloranodyne is fully as efficient as bromidia, but it is more inconvenient to administer. If the patient is very nervous I usually begin two or three days before the operation with one-half tea-spoon of bromidia four times a day. Just before operating I note the time of last dose and condition of patient and then give perhaps double the former dose, since the effects will be antagonized by the operation. To a number of patients, pregnant and otherwise, who previously occupied the chair in a condition of continual nervous and muscular tension,—to such patients I have administered these agents with the satisfaction of rendering the patients mentally and physically tranquil in the chair with no unpleasant results following.

Regarding the extraction of teeth, unless general anesthesia be induced the child in utero would be jeopardized while only the ordinary mortality from anæsthesia would apply to the mother. If the operation indicates severe pain, and the patient be reasonably favorable to anæsthesia, observing the usual rules for choice and contra-indications, it would certainly be implied, remembering specially that fatty degeneration and dilatation of the heart, advanced pulmonary disease, and acute nephritis are proper causes for inducing abortion and also contra-indicate anæsthesia. In

these cases we may operate without anæsthesia and if an abortion follows, it follows from justifiable cause.

#### DISCUSSION.

DR. H. A. SMITH: In substance Dr. Smith said that he regarded the paper a valuable contribution on this subject, the author giving in it a good idea of the causes of abortion. The organs are in an abnormal state of activity in pregnant women and impairment of or operations on the teeth at such a time may cause reflex action of the nerve centres, the impulse being carried from the teeth to the organs of generation.

Systemic diseases, such as syphilis and small-pox, we know have caused abortion. Might not the inhaling of noxious gases, for instance nitrous oxide, ether, etc., bring about abortion?

Another cause may be local disease of the uterus. With some women suffering from this affliction abortion seems to be habitual. Now, if we operate on the teeth of such patients and abortion follows, it might be due to this cause rather than the operation itself, and yet the dentist would be blamed. Blows on the body or a fall may produce abortion. Psychical causes, as fright, fear, etc., are prolific causes.

When we are called upon to operate for pregnant women we should proceed cautiously. Treat carefully whatever may be required, whether it be toothache, or abscess; and by the way, chronic abscess is one of the most difficult lesions we have to treat for these patients.

Shall we extract teeth during pregnancy? I answer no, if it can be avoided, and I am particularly adverse to the use of nitrous oxid for extracting, at such a time. If the tooth be one that is broken down it is possible, in some cases, to extract it by slipping a rubber ring over the tooth; this will gradually work up under the gum and cause the tooth to loosen.

There is another phase of the subject not mentioned in the paper, that of the effect of material impressions upon the foetus. It is well known that certain impressions have thus caused deformities in the child, and that alcoholic influences have been inherited. He referred to a case of a child-murderer, the mother of whom was an habitual reader of bad novels. At the trial the question was raised whether the maternal impressions did not leave an impression on the child. This brings up the question

whether such impressions really do affect the offspring mentally. Would extracting of teeth or other dental operations affect the child? If these were carried through several generations would we eventually have in these persons a great dread of dental operations? I may be carrying this matter too far but it is an interesting question for our consideration.

DR. C. R. BUTLER: The author of the paper has become convinced that the operation cited would not again be tried. I think it will serve as a warning, especially to the younger men in the profession. We should temporize as much as possible when operating for pregnant women. How much are we responsible for the impressions if made on the child? When children come to us with a great dread of dental operations we should have more patience with them than is exhibited. We should aim to get their confidence by gentle treatment and in operating for them temporize as much as possible until such confidence is secured or the child outgrows this fear.

In the use of anesthetics during pregnancy we should be more cautious than ordinarily. If forced to use an anesthetic let it be a nitrous oxide or a little ether used to the stage of "ether glow." All anesthetics cause certain contractions of the muscles and there is where the danger lies. The manner of the operator has much to do with allaying the fear of the patient. No matter how much anxiety the operator has he must conceal it from the patient. He should be kind, yet firm. The author has not made the distinction between abortion and miscarriage that there should have been for there is quite a difference.

Notwithstanding the fact that gynecologists set forth so large a per cent of women that are diseased in their pelvic organs, I do not believe it. Some specialists are honest but others are not. Specialists are apt to become hobbyists and see things only in one light. If there are any dentists riding hobbies they better get down and practice on a common-sense basis.

DR. OTIS ARNOLD said that this was one of the best papers he had listened to in years. The object of an anesthetic is to avoid shock and this can best be accomplished by profound anesthesia. If we carry anesthesia only so far as the "ether glow," we are liable to get shock and an impression on the infant, *in utero*, be produced.

DR. H. A. SMITH: I am not willing to admit that the object

of an anesthetic is to prevent shock but rather to allay mental fear and such sensations. Prof. Hamilton has said that we are not justified in carrying anesthesia to its full extent for the extraction of teeth and such operations. If the operation be a prolonged one then complete anesthesia is needed.

Dr. H. J. Cusack: Dr. Smith has referred to the possibility of noxious gases causing abortion. I hardly think that the administration of nitrous oxide would cause abortion, from the fact of its being a noxious gas, but extracting teeth under the influence of the anesthetic might cause a shock that would produce abortion.

I did not refer to maternal impressions in the paper for it was already extensive enough.

We do not find reported cases in our literature, yet I believe they can be obtained.

Dr. Butler spoke of the distinction between abortion and miscarriage. So far as the causes are concerned there is but little difference. Abortion may occur up to the seventh month and miscarriage later. Regarding the per cent of women having pelvic disease, I have taken a low estimate. Statistics show that from 62 to 92 per cent are afflicted.

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## Can the Dental Legislation of this State be Improved, and If So, Is it Politic to Attempt it?

BY H. C. ROCKWELL, D.D.S., WENTON HARBOR, MICH.

All legislation must be judged by circumstances. The dental law of Michigan may not be in all respects an ideal one, but neither is the law upon any other subject. It is useless to put laws upon our statute books which, no matter how theoretically just and perfect, can be only imperfectly enforced or else become a dead letter.

Laws can only be carried out in this or any other State, when they are justified and upheld by public opinion. A law that is too strict, or one that attempts too much, is soon either entirely disregarded or promptly repealed in consequence of adverse public opinion. Dental laws, medical laws and pharmacy laws are comparatively recent forms of legislation, and are very much misunderstood by the community at large.

By a large portion of the people such laws are looked upon as entirely in the interest, and for the benefit of the dentist, physician and pharmacist, and that there is no advantage in them to the community as a whole. Such being a very general opinion, it is in the first place very difficult to get these laws enacted, and more difficult to enforce them after they are upon the statute books. I had some experience in the legislature of 1891, when—I think I may claim it without too much egotism—through my efforts the amendment to the present dental law, giving the State Board of Dental Examiners the power to reject diplomas coming from fraudulent colleges, and colleges not up to a proper standard, was placed on the statute books. The reasonableness of this amendment was so patent that, when I first brought it up, I took no trouble to do any work for its passage except to make a simple statement of the facts in the case, and I found my measure, to my great surprise, buried under an avalanche of adverse votes.

I was obliged to get a reconsideration of the vote and send it back to the committee, and finally secured its passage, mainly as a personal favor to me by my colleagues.

During the discussion of the bill a very intelligent member said that he "didn't know why the dentists should have any bill for their benefit," and that he "believed men had just as good a right to pull teeth as they had to make shoes, providing any one wanted to employ them," and further, that there was a tooth puller who lived near him that could beat any college bred dentist on earth pulling teeth, and he didn't see why he should be stopped because he had only "picked up the business."

In short, the average legislator, and the average of the community too, think like the old hard-shell Baptist preacher, who said that he "never rubbed his back agin no college nor got no sheepskin, and he reckoned the apostles didn't neither." There is a very general idea among people that a man who is a "Jack at all trades" is in some way a sort of a genius, and it is rather to his credit that he has "picked up the business," rather than to have studied for years to perfect himself in the knowledge of any calling; and many times, on account of that idea, we have occasion with the poet to realize that, "a little knowledge is a dangerous thing." Drink deep, or taste not the Pierian spring," when we see the artistic efforts of some of these "natural geniuses," which, by reason of their traveling propensities, are

widely scattered throughout the country and, whatever else may be said, are certainly a conspicuous advertisement wherever they may be found. The law in Michigan may be far from perfect, but it is doubtful whether it is certain of enforcement, in the state of public opinion as it now exists, in many parts of the State. We certainly, after working all these years to get it on the statute books, would not want to run any risk of its repeal. Neither, I think, do we care to render it any less stringent in its provisions.

I know that many believe that a graduate of any dental college should be allowed to practice, and that the present provision enables the State Board of Examiners to shut out many graduates who are equally qualified with the University of Michigan men. While this may be true, it is equally true that if some provision of this kind is not in the law it virtually renders it a nonentity by letting in the man who purchases his diploma from Delevan, or obtains it where money, rather than education, is the qualification for a "sheepskin."

There seemed to be no way to measure the standing of a college, looking at it from the State's point of view, except by comparing it with the institution maintained and governed by the State itself, and it afforded a good argument and, in my opinion, the only one that secured the passage of the bill, to be able to say, "We have a dental college of our own; why should we not require those coming from outside the State to have equal qualifications to those which we require from ourselves."

While the provision may in a few instances be a hardship, we certainly do not desire to take any backward step, unless the law defeats itself by its stringency, which I do not think it does, as now constituted.

One thing is certain, we never secured any dental legislation at all, though we strove for it for many a year, until we had a dentist, our friend Dr. Metcalf, a member of the legislature, and, as I said before, the amendment, which makes the law effective, was only secured by myself after one failure, and then only by the personal influence which, by being a member, I was able to bring to bear..

I can see points in which the law might be improved, but, unless we have "a friend at court," a man in the legislature who is either a dentist himself, or who is willing to work for the thing

in season and out, and will be sure to prevent any retrogression, I think we had better use such influence as we can to have the law remain as it is. Probably, if we except the State of New York, all of whose educational institutions are a part of a great system under the supervision of the Regents of the University of New York, we have as efficient a law as any State in the Union. It will, if only reasonably enforced for a few years, protect the public of Michigan against a very large proportion of the charlatanism which formerly existed, and slowly but surely raise the standard of dental practice in this State. Reforms of all kinds come slowly, while we should never relax our efforts for the improvement of our noble profession we must remember that "Rome was not built in a day," and that the spider in the prison of the famous king of Scotland only succeeded after many efforts.

If the dental department of our great university is kept well in the van of progress in the profession in the future as it has been in the past, and we require all practitioners in this State to enter the doors of practice in substantial equality to its requirements, the law part of the question will be all right, and it will only be necessary to educate the people, and the profession itself, up to the standpoint of a reasonable enforcement of its provisions. Let us "pluck the beam" from our professional eye first, and perhaps we can see more clearly how to "remove the mote" from the eye of the dental law.

Do we, as dentists, make any effort to enforce the law as it now exists, or use any endeavor to educate the people up to the proper knowledge of what it is intended to accomplish? Do we not rather allow the quack and the itinerant tooth-puller, with his cocaine solution, to travel over the country poisoning the people, and doing irreparable injury in the way of destroying good teeth, and do it on the selfish ground that we are afraid people will not appreciate our motives, and it does us no financial injury any way? Of one thing we may be sure, and that is, the dental law is our own particular business, and if we make no effort to have it effective, nobody else will do it for us.

Let us do that duty that lies plain before us—rather secure the good of that which we now have than seek for more law—when we, the great dental profession of Michigan, are too lazy, or too indifferent, or too cowardly to try to enforce that which

we have already got—that, which although it may not be perfect, has given us much trouble and taken much time to get, and which, if repealed, is probably far better than we could secure again.

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### A Useful Preparation.

BY F. W. SLABAUGH, D.D.S., OMAHA, NEB.

WITHIN the past two years I have been using to quite a large extent what I call a mummifying paste in the following manner. Suppose a *dens sapientia* with an inflamed and aching pulp. I would make an application of devitalizing paste and in 15 or 18 hours I would remove it and drill into the pulp chambers and remove a small piece of the pulp. I then force into the pulp cavity a small amount of the mummifying paste, which is composed of—

B	Thymol	3 <i>i</i>
	Glycerol	3 <i>i</i>
	Dried alum	3 <i>i</i>

Zinc oxide q. s. to make a thick paste.

Cover this with cement and fill with whatever material is desired. To those that have never used a process of this kind I would say that it is a grand thing in a great many cases that would suggest themselves in every day practice. For experiment I recently removed a filling that had been in about three months. I found the pulp in a dry, hardened condition, and preserved from the process of putrefaction.

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### Dental Service in the Army.

At a recent meeting of the Ohio State Dental Society, a resolution was adopted advocating the employment of dentists in the U. S. army.

This resolution refers briefly to the necessity for dental services among the enlisted men, recommending that Congress adopt such measures as will provide this special service; also recommending that every dental society in the land adopt a like course in furthering the interests of humanity.

The resolution also provides for the appointment of a committee of one, empowered to represent the interests of the Ohio State Dental Society in this matter.

Our government expects its soldiers at all times to render prompt and efficient service, and demands primarily that the recruit be physically sound. It has an established standard of soundness, and in order to keep out those who do not reach this standard, subjects each applicant to a medical examination, which determines his fitness or unfitness to serve in the army of his country.

Furthermore, the government attempts to maintain the standard thus determined, by environing the soldier with comfortable and sanitary quarters; furnishing him with sufficient and wholesome food; exacting adequate exercise and personal cleanliness—in short, throwing around him every safeguard known to science to promote his physical welfare. Furthermore, should he be stricken by disease or disabled from any cause, he is cared for in modern well-equipped hospitals, and attended by skilled surgeons. Thus every need seems provided for.

But is this absolutely so? How about the provision for his dental organs? Surely the soldier is human; therefore his teeth are an important part of his physique, and if these become diseased or lost, the whole organism suffers as a consequence. It seems not a little strange that our nation should not have, before this, included in its medical service the treatment of teeth.

Granted that the entrance examination be thorough and includes in its requirements the possession of a sound set of teeth, there still remains the susceptibility to the insidious process of dental caries, which has no limit and is no respecter of persons; for other diseases may come and go, but dental caries, when once begun, like the brook, "goes on forever."

The mere act of passing from civil into military life does not render a man immune from dental caries, and it is well-known that men thus afflicted suffer greatly, indeed are often from this cause totally disabled for a longer or shorter period from discharging their regular duties. Therefore it seems only reasonable that some adequate provision be provided, thereby improving and to that extent completing the medical service of the army. Thus far the only remedy at the soldier's command has been the extraction of the offending teeth—the operations usually being

performed by the hospital stewards, men wholly without dental training, from whom it would be unreasonable to expect the necessary knowledge and skill to successfully practice this branch of surgery. Even if they were expert extractors of teeth, the immediate result of their operations would be the loss or what were intended for useful organs, the certain impairment of masticating facilities, and who can predict the ultimate results upon the whole constitution? Indifference to the needs of her servants is not in keeping with the generous policy which usually characterizes our nation; therefore the dentists and medical men of this country, by reason of their knowledge of existing conditions, earnestly appeal to every member of Congress to aid in the passage of a law that will supply this evident insufficiency.

Dentists, as members of the present examining boards, would undoubtedly be valuable acquisitions in preventing the admission of men with defective teeth, and in this respect alone would render valuable service.

Furthermore, in cases of gun-shot wounds, and other injuries about the mouth and face, the dentist's special knowledge and skill in devising appliances for these regions would pre-eminently qualify him for managing this class of cases which the vicissitudes of war often presents. Altogether considered, the dentist is a necessary factor no less in the army than in civil communities.

Dear reader, will you not lend a helping hand in this good cause? Will you not enlist the services of your representative in Congress to support an enactment with this end in view?

If this matter is brought before the minds of those who rule the affairs of our nation, we may hope that they will speedily take measures to add this branch of healing to their otherwise almost perfect system for the care of those who are the safeguard of our country's frontiers and coast defences.

OTTO ARNOLD,  
Representative Ohio State Dental Society.

## ALL SORTS.

## The Milliampere Meter.

I consider the milliampere meter an important adjunct. I believe that if in the future we see any ill results from this method of practice, we shall see it from the careless use of the current, and from the cases where we have not known what we were doing because we did not have the milliampere meter to guide us. The only possibility of ill results that I can see would seem to be in cases where too much current is administered to a tooth with a large cavity and a thin layer of dentine covering the pulp. It seems to me theoretically quite possible to cause a lesion on the surface of the pulp by electrolysis of the pulp tissue itself. Dr. Van Woert has said that one-fifth of a milliampere is sufficient; but I think I get better results from a larger current. I do not hesitate to give a full ampere, and in selected cases even more than that. I should, however, hesitate very much to pass more than a milliampere of current through a deep cavity, where I had reason to believe there was but a thin layer of dentine, let us say equal in thickness to a sheet of ordinary blotting-paper; I should prefer to use not more than half a milliampere with such a cavity as that.—DR. TILLETT, *Items*.

## Actinomycosis of the Lower Jaw.

Ducor of Paris reports a case of an enormous tumor on the lower jaw, with great emaciation and general distress. The patient belonged to the upper classes and submitted to treatment from twenty surgeons, during eight years before a correct diagnosis and relief were obtained. Ducor suspected and established the presence of the ray fungus, and secured great improvement with potassium iodid, 2.5 grams per day, painting the intro-buccal surface of the tumor with tincture of iodin, and injecting it into the parenchyma, mixed with equal parts of glycerin. Potassium iodid in this case again, showed itself the specific remedy for actinomycosis, although the lesions were of too long standing to expect complete recovery. There is no doubt that this disease is far more frequent than is generally supposed, but fails of recognition, so that the possibility of actinomycosis should be borne in mind in any tumor of the jaw. In this case it was found that the patient had the habit from her youth of chewing grains of wheat, etc., and picking her teeth with the stems.—*Bulletin de l' Academie de Med.*

### Practical Items.

The following items are taken from a report, in *Dental Review*, of clinics at the reunion of the Alumni Association of the Chicago College of Dental Surgery:

*Riveting porcelain facings.* The possibility of riveting porcelain facings without danger of breaking was effectively demonstrated by Dr. B. D. Wikoff, of Chicago.

Dr. Wikoff imbeds the facing in the end of a plaster of Paris cylinder about one inch in diameter by one inch in length, and when cylinder becomes hardened applies the hammer with sufficient force to quickly and perfectly rivet the pins.

*Accurate methods for fitting Logan crowns.* Dr. Charles J. Sowle, of Rockford, Ill., gave a practical demonstration of his method of adjusting Logan crowns.

Dr. Sowle dresses down root below the gum line all around, leaving it somewhat convex from labial to lingual, then prepares canal to receive the post of the crown. A false pin long enough to extend to occlusal surfaces of adjoining teeth is placed in canal, and an impression in plaster is taken, the plaster being allowed to partially set before forcing up for the purpose of crowding back the gum. The impression when dried is poured with fusible alloy, producing a metal model upon which the tooth is fitted.

*Combination filling—precipitated gold and oxyphosphate.* Dr. W. V-B Ames, of Chicago, commanded much attention in his operation of filling a cavity with cement in which was incorporated precipitated gold. This combination of gold and cement, it is claimed by Dr. Ames, who originated it, produces a filling material of a great practical value.

*Gold filling, using cocaine crystals while placing cervical clamp.* Dr. R. M. Pearce, of Rock Island, Ill., demonstrated the painless placing of the cervical clamp by the use of cocaine crystals, and inserted a large and very handsome gold filling, using a hand mallet.

*A new method of anchoring bridge work.* Dr. Geo. B. Perry, of Chicago, demonstrated a new and novel method of anchoring dummies to live teeth. The case presented by Dr. Perry was that of a cupid dummy swung between and anchored to the left superior lateral and first bicuspid, both of which teeth were alive and having no metal visible anteriorly. Dr. Perry's method briefly described was as follows: Two small cavities were drilled in the bicuspid, one on the proximal surface well down toward the gum line; the other in the mesial groove of the cusp; these cavities being designed to receive the bifurcated bar, this constituting the anchorage at that end.

The novelty of the operation, however, was in the anchorage to the lateral. In this tooth a cavity just large enough to receive the end of one of the little platinum pins from a porcelain tooth, was drilled well down on the palatal surface. A piece of No. 29 pure gold plate is then burnished over the palatal surface of the tooth, and to this the platinum pin is soldered. The bar upon which it swung the dummy is now soldered to this and the whole is ready to mount, the lateral anchorage being made with cement, the bicuspid with gold or amalgam.

*Bleaching by cataphoresis.* Dr. J. G. Reid, of Chicago, demonstrated a method of bleaching teeth by cataphoric action, the same consisting of decomposition within the tooth by cataphoresis of chloride of sodium. The operation was successful.

*Emergency crown.* Dr. A. O. Hunt, of Chicago, exhibited and placed in position a crown termed by him an emergency crown. This crown which is designed for roots so badly decayed that the use of the ordinary crown is precluded is made by burnishing platinum within the cavity to a line with the gum, passing a post through the bottom of this platinum cup and anchoring it as deeply as practicable in the root. Removing and filling the cup with solder, then attaching crown.

*Formation of cavities in porcelain teeth.* Dr. Geo. W. Whitefield, of Evanston, Ill., showed how cavities may be drilled in porcelain teeth without the use of diamond drill. From a piece of copper wire a bur is fashioned as nearly like the regulation bur as may be. By the application of finely pulverized diamond powder to this bur, cavities may readily be drilled in porcelain.

*Appliance for holding rubber dam in place in cervical and buccal cavities.* The dentist should be a man of resources, taking advantage of anything and everything that will lighten his labors and his patients discomforts. This sort of dentist is typified in Dr. W. H. Taggart, who has surprised his professional friends, notwithstanding they are always looking for something new from him, by discarding cervical clamps, shoving the dam up on the root and nailing it there.

A demonstration of this innovation in cervical work was made by Dr. Taggart. Little brads about 1-24 of an inch in length are made of number eight cambric needles, and sharply pointed; an ordinary automatic plugger point is broken off and slightly hollowed out on the end and is then magnetized. Placing this point in an automatic plugger Dr. Taggart places the little brad in position, where it is held by magnetism, forces the dam up where he wishes it to remain, places the little brad in contact with the cementum at a point where it will hold the dam, and with two or three light blows drives it into the cementum where it remains firmly until removed. The young man, a student at the college, on whom

Dr. Taggart operated, declared that he suffered no discomfort from the insertion of the brads, and when removed no trace of the points of insertion could be discovered.

*Surgical.* Dr. Truman W. Brophy performed an operation for the relief of chronic antral abscess accompanied by polypi, and involving the nasal bone and ethmoid cells. The operation consisted in incising and deflecting the soft tissues beneath the cheek, no external incision being made, and removing a large portion of the anterior wall of the antrum, extending the opening well up toward the orbit. The diseased portion of the nasal bone was then removed, and the cavity thoroughly curetted.

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### Carbolate of Iodin.

Its preparation is at once simple and ready and should be done just before using. To about two or three ounces of distilled or filtered water, which has also been boiled, but reduced to 100° F., add first ten or twelve minims of Calvert's cryst. carbolic acid No. 1, then the same quantity of official tinct. iodin. Stir this up by filling the syringe bulb and injecting back into the glass. The muddy color of the iodin will disappear, with an apparent evolution of gas. A peculiar odor is at once perceived, entirely different from that of either of the principals. When gingival inflammation is present, use as hot as the patient can stand.

I have found this far superior to listerine, boracic acid and all that class.—E. G. BETTY, *Review*.

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### Iodine and Salivary Deposits.

Dr. Register described the method of using iodine, which is as follows: Applications of the dilute tincture are freely made to teeth and gums, which not only constringe puffy gums, drawing them away from about the teeth, but clearly outline any deposits which may be present. Deposits are defined by this means, which without it would entirely escape detection. The patient expresses gratification, not annoyance, at the sensation produced by the drug. The iodine appears to have the power of loosening the deposits upon the teeth. It insinuates itself into the minute recesses of rough areas of the crowns. The iodine is followed by applications of commercial ammonia, which is immediately decomposed, a colorless solution formed, and the teeth are found to be much lighter in color. The surfaces are subsequently cleansed and polished by means of buffs and fine pumice.—*International*.

### A Non-Toxic Local Anesthetic.

Dr. W. H. Jones, Fultonville, N. Y., says:

"The hypodermic injection of eucaine, combined as follows, will give a satisfactory and painless extraction, and the nervous and excited patient will never again postpone a necessary extraction, but will endure the next operation, should one be necessary, with unruffled nerves:

	Grammes.
Eucaine hydrochlorate	0.8
Hamamelis Virginica	7.8
Glycerole	1.6
Hydronaphthol sol.	0.129
Guaiacol	0.129
Strophanthin	0.013
Aqua dest.	19.5
Saccharin ad grat.	

The above formula has been used with unusual success for the past six months. There are many cases in which the operator does not care to administer the nitrous oxide or ether, but owing to the nervous and sometimes debilitated condition does not wish to operate without alleviating the pain in some manner. A local anesthetic is a useful friend in this extremity.

The point of puncture can be anesthetized by touching the mucosa with a solution of trichloracetic acid, glycerol, and cocaine in the following proportions:

	Grammes.
Trichloracetic acid	1.296
Glycerol	1.944
Cocaine	1.620

If the gums are healthy, they are not very sensitive, and the puncture may be made by making a firm pressure with the index finger of the left hand and placing the needle at the edge of the point of pressure. Disinfect the mucosa before proceeding to operate.

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### An Accident with Cataphoresis.

I desire to report a case where I filled a labial cavity in a superior central incisor, the cavity being only slightly under the gingival border, the clamp placed in position, nicely exposing the cavity. I applied the electric current and the patient experienced some pain during its use. Upon the removal of the rubber dam I found that we had destroyed the

gum tissue nearly half way up the root; we had burnt the periodental membrane, also leaving a portion of the alveolus exposed nearly one-quarter of an inch. Of course, the tissue sloughed after a little while, although we used the ordinary precautions to prevent it. I had the instrument maker try and find out what the trouble was, but he has failed to offer a perfect solution of the difficulty.

In another instance I prepared a cavity in the mesial surface of a molar, adjusted the rubber dam, applied the solution in a similar manner to the case just reported, and we had the loss of a large amount of gum tissue. I report these unfavorable cases so as to give you the benefit of the mistakes I have made, or rather the failures I have had in the use of the cataphoretic obtunder.—C. P. PRUYN, *Dental Review*.

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### Suggestions on Cataphoresis.

Among other things, in discussion at N. Y. State Society, (*Comsoc*), Dr. F. T. Van Woert said :

"To a busy man the necessity of holding an electrode for the introduction of medicaments becomes very irksome. It is also annoying to the patient to have the operator stand there for that length of time. To overcome that difficulty has been my aim for some little time, and in that line I want to show you on the blackboard something that you can make in your own offices, which will be a practical electrode for any case that may come to you. In the first place, the most difficult cases we have to anesthetize in sensitive dentine are those cavities along the buccal surfaces, well down under the gum-margin, where considerable pressure is necessary to get the rubber-dam clamp into position to protect them or isolate them from the cocaine which we put into the cavity. First get a rubber cup, such as is used for polishing. (Illustrating.) There are three sizes furnished by almost any supply-house. Passing through that cup is a wire to connect the current. In the cup is the pledget of cotton on which the cocaine is put. That is carried to the place where you want to make the application. Five minutes will so anesthetize the soft tissue that you can place your clamp in position without causing pain. When you have the clamp in position, the anesthesia of the dentine is the next consideration. To overcome that, take German-silver sprung wire and simply spring it in on the lugs of the rubber-dam clamp, placing the cotton in the cavity and saturating it with your solution of cocaine. It is certainly as good as you can get. For approximal cavities, I found that the clamp would not serve the purpose. I took the same kind of wire and bent it, using the same connection on the cord, to connect the elect-

rode. This has a little hard-rubber piece on it to prevent it from puncturing the dam. The spring carries it up into the cavity under the cotton. You can all make this in your offices, and it is utterly impossible, after you get it in place, to get it out without tearing the dam or bending the electrode. You can use whatever current you wish, and leave the patient in the chair while you are attending to other duties.

There is great difficulty in using electricity in the mouths of children, from the fact that they will allow the ordinary negative electrode to sag. They make and break the circuit. They do not drop it, but they forget to hold it tight. I devised a piece of tin with a sponge on the other side, made to slide over the wrist. This is an important thing. If you use electricity very much, you will find, if you depend upon the hand electrode, they will forget to hold it tight, and let it sag, and if you have only ten volts on and jump from nothing to ten volts each time, you will make your patient jump each time.

I believe there is much to come out of electrolysis with the cataphoretic apparatus,—low voltage and the introduction of zinc chlorid, as Professor Morton told us. I have one case in mind, in Brooklyn, that I have tried for months to cure: to eradicate a stubborn sinus, chronic alveolar abscess. I was one of four dentists who tried it, and I failed. I finally said the tooth would have to come out. Just about that time Mr. Wheeler brought into my office one of their machines, and later I dipped a piece of very fine wire into zinc, afterward coating it with chlorid of zinc, forming a little ball at the end; the wire was insulated with paraffin; it was carried to the seat of the abscess. A current of ten volts was turned on and kept there for about five minutes, and that mouth is as perfect today as it can be. There is no credit due me for that, because Professor Morton told us about it; but the results are marvelous. Since that, I have used it in many cases and with like results, so I feel that cataporesis in dentistry is going to be as necessary as the dental engine."

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### Electricity in Dentistry.

I believe that properly utilized cataphoresis has come to stay. If used for no other purpose than the treatment of inflammation of the periodental membrane, an instrument is worth the money paid for it. The time required in treating the tooth is not half that which is used in preparing a cavity without it. However, I believe that it can be so arranged that there is no waste of time. Place the patient in an ordinary chair, make an application of the current with a suitable electrode, give a current of, say, one-fifth of a milliamperc, which can be done

without pain, and you can go away feeling sure that if satisfactory results are to be had at all you can get it with this amount of current. That is my experience. I find that a high tension current, and, by that, I mean a current that is sufficient to cause intense pain—three, five, or ten volts —might cause as much pain to one patient as fifty volts to another; but if it is severe enough to cause pain it is not the current nor cataphoric medication. In my later operations my practice has been to turn on the current until the patient feels it, and then reduce it until it was not felt. As soon as I get a reading high enough, I leave it until it is time to renew the cotton. I would not hesitate to leave a child in one chair for an hour, if necessary, while I was operating on some one else, provided I had only what could be tolerated without suffering.—F. T. VAN WOERT,

*Items.*

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### Office Experience with Cataphoresis.

In discussion at Minn. State Society, (*Dental Review*) Dr. H. L. Larrabee among other things said:

"I don't want two hours to administer cataphoresis. I don't want to be in my operating room alone. I don't care how much business I have—the more the better. I use my volt selector in this way: I find my cavity, adjust my dam, apply my electrodes and put them into the hands of my young lady assistant and go about my business. At the expiration of fifteen minutes I take the patient and prepare the cavity. I don't ask if it hurts. I say, "Here I have a harmless painless method by which I can handle your teeth without a particle of pain" and I prepare the cavity, introduce the filling and finish it up and ask, "Did I hurt?" The usual reply is, "No, I never had such a delightful operation in my life." I had a young lady about eighteen year of age, with defective teeth, syphilitic. She asked if the operation would be very painful. I said "I will give you chloroform while I cut off the tooth and take out the nerve, so you won't feel it." Some six weeks previous she had had lung fever and her lungs were in bad condition. I had her examined and the result was that it would be improper to give her chloroform and my only result was cataphoresis. I approached the case with a great deal of trepidation and hardly believed I could do anything with it. It had to be done. I cut a small cavity in one of her teeth, introduced a small pellet of medicated cotton, applied my electrode and turned on the current until it reached about forty volts by the selector and disconnected; found tooth very sensitive. I tested my selector and found I was using the negative current instead of the positive, and got no results. I applied it again for about fifteen minutes with the positive pole in the

cavity, then cut in, expecting there would be trouble. I was very cautious in removing the dentine so as to make the cutting operation when I came to the nerve as rapid as possible, and when well prepared, I got a very sharp bur and cut into it. The whole operation was eminently successful. I am using this almost every day in my practice and never have had a failure. I don't care what tooth you present to me, I am very sure I can handle it in a satisfactory way to myself and to my patient. I know there is a percentage, possibly prejudiced against anything of this kind, as I am not working in the interest of the Wheeler volt selector or any other organization, what I say to you ought to have its influence. There are those who don't care. I believe that is true. I believe there are dentists (not here) in other States, Wisconsin, Illinois, perhaps States far away, who don't care how much they hurt if they succeed in getting the job done quickly and getting their money. To such a one there is no use in cataphoresis, but to the one humane from the bottom of his heart, desiring to perform operations painlessly, it is fully worth the trial, and I am very sure that one who can manipulate the appliances properly will get from them the same results that I have."

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### A Case of Pyorrhœa Alveolaris.

I desire to relate a case where the patient was salivated some twenty years ago, and his teeth since have frequently troubled him more or less, not with any discharge from the gum, but occasionally a certain tooth would be attacked with calcic abscess. Through those abscesses he had lost three or four teeth. I have had him under my care for about eight years, and for the last four or five years his teeth have been comparatively comfortable. But this summer he went down to French Lick Springs and stayed there ten days. He drank the water, and that apparently brought back his old trouble; that is, all of the symptoms of salivation returned. The gums became inflamed, the peridental membranes very sensitive, and the gums bled profusely in the morning on rising. His teeth were excessively sore in the morning. I gave him a sitting last week and searched for calculus, but did not find very much. I gave him a treatment, using iodid of zinc. He reported yesterday that his gums were in very much better condition. There has been no bleeding since the treatment. The soreness is gradually subsiding and he is feeling quite comfortable.

The question I desire to raise is this—what was there about the water, if it was the water, that brought back the old trouble? The trouble is apparently easily controlled, but it was evidently a recurrence of the old difficulty.—C. N. JOHNSON, *Dental Review*.

**A Failure with Cataphoresis.**

I recently had a case where an amalgam filling was in the sensitive cavity of a tooth, which had to be taken out. Now, how about cataphoresis? It didn't work at all. The patient having been accustomed to operations which were almost painless, rebelled, and was very savage, I do not know whether I should ask pardon for referring to something that is very well known in some quarters, but I find that it is not known in all quarters, and that is that I use chloride of ethyl, as I did in this instance. In two and a-half minutes I had complete anesthesia, and was able to finish the operation almost completely before the sensibility returned.—E. A. BOGUE, *Items*.

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**A Stitch in Time.**

Who is there in the dental profession that has not often wounded himself? The left hand is generally the victim, as the right hand holds the instrument. These little mishaps are very annoying and troublesome particularly if not immediately attended to. If it is a cut, to any great depth, I allow it to bleed freely as there will be less inflammation. I keep a fine needle, with a white silk thread in, well waxed. A small wad of bibulous paper saturated with four per cent. of cocaine is placed upon the wound, and a finger on the same hand can hold it there for ten minutes, after which it can be sewed as easily as if it were leather. It will heal by first intention. The parts being brought together, the bleeding will cease at once and you can resume work. This has saved me much pain, inconvenience, time and money.—G. V. RELYEA, *Dominion Journal*.

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**EDITOR'S NOTES.****Representation in the Army and Navy.**

ON another page we print an article from Dr. Otto Arnold, urging that all dental societies in the United States join forces in an attempt to get a bill passed by Congress, appointing dentists to positions in the U. S. army and navy.

This is a matter of great importance and one that should receive legal recognition. The subject has for some years been agitated, more or less, and committees have been appointed by

the Southern and other societies to appeal to Congress for the passage of such an act, but all efforts so far have been futile. The only way to obtain the desired legislation seems to lie in united and organized effort. If every dental society in the United States will appoint a committee, and these committees meet jointly and formulate plans, and then properly present their appeal to Congress, it ought to bring the desired legislation; but unless there be a combined and determined effort made the cause will fall as hopelessly as it has in the past. We therefore urge that every dental society take action in this matter at once, organize and make a vigorous effort to obtain this needed legislation.

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### Delayed.

THE third instalment of Dr. Butler's article on "Working of Steel," has been unavoidably delayed but it will appear in the April issue.

### New Publications.

ENGLISH SYNONYMS AND ANTONYMS, with notes on the correct use of Prepositions. By James C. Fernald, editor of Synonyms, Antonyms, and Prepositions in the Standard Dictionary. Pages 564. New York: Funk & Wagnalls Co., pub., 1896. Price, cloth, \$1.50.

While this work is designed as a text-book, it is also a supplement to the Standard Dictionary. We have had Roget's Thesaurus, works by Soule, Fallows, and others, on this subject, but this is far superior to any yet published. The work treats within 375 pages, more than 7,500 synonyms. The author has given every definition or distinction in the fewest possible words consistent with clearness of statement, because such condensed statements are most easily apprehended and remembered.

The method followed has been to select from every group of synonyms one word, or two contrasted words, the meaning of which may be settled by clear definite statement, thus securing some fixed point or points to which all other words of the group may be referred. The great source of vagueness, error, and per-

plexity, in many discussions of synonyms is, that the writer merely associates stray ideas loosely connected with the different words, sliding from synonym to synonym with no definite point of departure or return, so that a smooth and at first sight pleasing statement really gives the mind no definite resting place and no sure conclusion. A true discussion of synonyms is definition by comparison, and for this there must be something definite with which to compare. When the standard is settled, approximation or differentiation can be determined with clearness and certainty. The author has incorporated in this book, by permission of the publishers of the Standard Dictionary, much of the synonym matter prepared by him for that work. All has been thoroughly revised or reconstructed, and much wholly new matter has been added.

The book contains also more than 3,700 antonyms. These are valuable in supplying definition by contrast or by negation, one of the most effective methods of defining being in many cases to tell what a thing is not. To speakers and writers antonyms are useful as furnishing oftentimes effective antitheses. No library is complete without a copy of this work and it will be found invaluable by all who desire to speak and write correctly.

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#### TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION, 1896.

The work this year comprises 144 pages and while the subject matter is perhaps of not so scientific a character as usual, it is nevertheless of great practical value.

There should be more interest taken in the preparation of material for this society, as it is the representative one of American dentistry. We hope that with the consolidation of this and the Southern society, new interest will be awakened and new methods inaugurated that will tend to bring about changes much to be desired, and an abundance of material of which American dentists may justly feel proud.

#### BOOKS RECEIVED.

Dental Pathology and Therapeutics. By H. H. Bufchard. S. S. White Co., publishers.

Crown and Bridge Work. By George Evans. Fifth edition. S. S. White Co., publishers.

## BRIEFS.

**A Suggestion.**—To prevent a lower base plate bending, imbed in it a semi-circle of wire.—*Dr. Boxton, Stom. Gazette.*

**Salivary Calculi.**—Men are affected about ten times as frequently as women with calculi formation in the salivary glands.

**Cannot Bleach Metallic Stains.**—I will say that it is time uselessly spent to try to bleach a mineral or metallic stain out of any tooth-structure—you cannot do it.—*Dr. Harvey, Register.*

**To Retain Separation of Teeth.**—To avoid separated teeth coming together before the cavities are filled, attach to your ligatures a loop of piano wire at such tension that the teeth are held apart until fillings are finished.—*Dom. Journal.*

**Deciduous.**—It is an interesting point that the development of the teeth is very much more rapid in girls than in boys, so that in children of the same age a much larger proportion of milk teeth are found among boys than among girls.—*Dental Practitioner.*

**Linen Tape as an Amalgam Polisher.**—If the linen tape is fine, as it should be, and properly handled, it will polish down an amalgam filling beautifully, leaving cleaner cut edges and a smoother surface than bibulous paper can possibly do.—*Dr. Watkins, Inter.*

**Cocain not Stable.**—There is one thing about cocaine that I think you ought to know; that is, it decomposes in forty-eight hours. You need to prepare it fresh when you use it; if it is more than forty-eight hours old, it will not give good results.—*Dr. Meeker, International.*

**Physical Impressions.**—Whilst giving full credit to all material obtundents and local anesthetics, we must look to other immaterial remedies to relieve at least half the horrors of the dental chair, and find these in suggestions and impressions on the patient's mind.—*Dr. Robinson, Stom. Gazette.*

**No advantage in Washing Amalgam.**—I have washed amalgam, but not recently. I do not think there is any great advantage in it, unless you have had it in the office for a long time. If you get it fresh and use it within a reasonable time there is no great gain in washing.—*Dr. Woolsey, International.*

**Calendula, after Extraction.**—A pledge of cotton, saturated with tincture of calendula, placed in the alveolus, after extraction, will aid in the rapid healing and filling up of the socket, as this remedy applied to a wound will cause it to heal without suppuration, leaving almost no scar.—*Dr. Wallace, Items.*

**Gum Margins in Pyorrhea.**—The margin of the gum never should be cut. You should never wound the gum any more than is absolutely necessary. You can, as Dr. Harlan says, pass through the alveolus to the diseased root when you cannot get your tartar off in any other way.—*Dr. W. J. Younger, Review.*

**They Do Exist.**—“I never read anything in the journals excepting the advertisements,” said one of the few non-subscribers. Well, that alone is an education worth more than the subscription. But such people ought not to object if we throw in forty pages of reading matter for them, just to show our generosity.—*Dom. Journal.*

**A Hint.**—Mr. A. W. Wright, jun., of London, finds that a little sulphate of copper sprinkled inside the spittoon (metal or earthenware) before the day’s operations commence, prevents any unpleasant odor, does not allow the interior of the spittoon to become furred, and renders it much easier to cleanse than usual.—*Ash’s Quarterly.*

**Varnish for Cavities.**—Gum benzoin and Canada balsam equal parts; dissolved in chloroform pretty thin. This varnish is useful to overcome shock from thermal change in cavities; may be used under oxychlorid to avoid pain. Will also assist in retaining first blocks of gold in inserting a filling, or will retain gutta percha.—*Dr. Clark, Dom. Journal.*

**A Solvent for Gold and Silver**—Which owes its efficiency to the presence of potassium cyanide, is claimed by Johnes Atkins, and is produced by heating a dry mixture of one part of potassium ferrocyanid with two parts of salt to incipient fusion. The product is poured into molds, and is quite stable in the air. For use it is dissolved in water.—*Stom. Gazette.*

**Run Your Own Business.**—The “busy man,” who is your patient, in his rush for dollars, will insist upon visiting his dentist at a time when he cannot do anything else. He wants an hour very early in the morning or late in the afternoon. “Can’t come any other time,” he says. Do not let this man have his way. Have your office hours and *keep* them, but do not let any man run your business or get in your office out of office hours, except in an emergency.—*Brit. Journal.*

**Open Bite.**—The presence of “honeycombed” teeth is frequently to be noted in cases of “open bite,” and is, I think, invariably accompanied by an arrest in development of the superior alveolar process. In the majority of cases the palate is usually high and the patients are mouth-breathers. This circumstance naturally leads one to speculate

whether mouth-breathing can in any way be a cause of the condition we have under consideration.—*Dr. Colyer, Brit. Journal.*

**Thorough Mastication a Necessity.**—With mastication imperfectly or indifferently performed in childhood, the stomach often becomes so weakened in functional power by over-taxation as to never fully recover its normal condition. So, also, the suffering that the child is subjected to through decayed and tender dental organs will often produce a permanently deleterious effect upon the delicate nervous organism, and modify, if not entirely change, the natural disposition of the individual.—*Dr. S. H. Guilford, International.*

**Ribbon Matrix**—Several of the members have inquired into the use of the ribbon matrix, which I have been using for some time, and have demonstrated frequently. They are made of strips of thin, planished copper, thin enough to pass into small interspaces between the teeth, and be laced in and out these spaces. Cavities which are compound have by this means an additional wall made, against which the filling is impacted and its contour outlined. A great deal of time is saved by this means, not only in the impacting of the filling, but in the subsequent polishing operations.—*Dr. Register, International.*

**A Penalty for Non-Disinfection of Instruments.**—So serious are the consequences possible, or even probable, as the result of neglect by dentist or oral surgeon, to disinfect his instruments, both before and after use, that we think a statutory penalty should be provided which might be enforced against a party, upon a proper showing, for every omission of that kind.

It is not enough that the injured party should be allowed his remedy in damages for a wrong of that kind, but the offense should be made a misdemeanor.—*D. Wiley, Stom. Gazette.*

**Treatment of Unyielding Abscesses.**—I have met a few cases where all the prescribed methods have failed. In these I extract the tooth, excise the end of the root, wash out the socket with bi-chlorid of mercury, and after filling the canal with gutta-percha, return the tooth to its former position, tying it fast to the adjoining teeth. The first tooth that I treated in this way was a superior central incisor. That was fifteen years ago and it is still in the mouth, doing good service. Since then I have treated a number in the same way with good success, they being limited to incisors, canines and bicuspid.—*H. C. Gilchrist, Items.*

**Bad Breath from Atrophic Rhinitis.**—It is the common belief by the laity that nasal catarrh and bad breath go together. Perhaps this comes from the quack advertisements. Hypertrophic or vaso-motor rhinitis never cause bad odors. Only when the atrophic process sets in,

and accumulations of morbid secretions are retained in the meati, do we have odor. Ordinarily the odor comes from decomposition of the dessicated matter, it remaining in the nostrils several days, but in others, wherein the turbinated bones are necrotic, it is constant when there are no retained secretions, and the stench is almost unbearable.—*Eclectic Med. Journal.*

**Precaution in Cocain Cataphoresis.**—There is one precaution that I think is well enough to be taken into consideration in regard to the use of cocain and electricity; it has been brought about by the use of it in other operations. During the last year a case occurred in Chicago, where it was being used in that way. The operator put one of the electrodes at the back of the neck and used the cocain, with the result that the woman died in the office, and it was decided that it being in direct application so near the medulla, that it was carried there and death was the result, so that it might be well to be warned in that respect, as to where you put the opposite electrode.—*Dr. Parker, Register.*

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### Obituary.

#### WILLIAM NEWTON MORRISON, D.D.S.

A SPECIAL meeting of the St. Louis Dental Society was held on December 22nd, 1896. President F. F. Fletcher said:

My friends, in the death of William N. Morrison, the dental world loses one of its pioneer and brightest stars. This society has lost one of its ablest men and most staunch supporters.

Every member has lost a friend whose place will not easily be filled. May no uncharitable word be spoken, but as we say peace to his ashes, may his memory ever be kept green by the greatness of his achievements.

#### BIOGRAPHICAL.

William Newton Morrison, D.D.S., born in East Springfield, Ohio, May 25th, 1882, died in Hot Springs, Ark., December 30th, 1896.

He was one of thirteen children of John R. Morrison. Those surviving are James B.; Mrs. Lane, of Kansas City, Mo.; and Mrs. Cook, of Mendota, Ill.

Dr. Morrison's early education was but meager, obtained in the common schools. He worked in his father's saw mill while

at home, but left in 1858, came to St. Louis to become a student of his brother James B., the inventor of the Morrison Dental Engine and Chair.

He arrived at his brother's office penniless, having spent his last money to have his boots blackened and his clothes brushed, so as to make a presentable appearance. The brothers kept bachelors' hall in the same building occupied as an office.

Jame B. went to Europe in 1862, and William took charge of Dr. H. J. McKellops' office, who also left the city about that time.

In 1864 he graduated from the Ohio Dental College.

In 1868 he and Miss Cornelia Holme, of Hannibal, Mo., were married. Two sons were added to the family—Peter Holme and William N. The former is married and has a son two years old.

The doctor was so successful in his early practice as to be able, in 1878, to build at 1401 Washington Ave., a house which combines a dwelling and a dental office, each complete for the purpose intended, the plans being made by the doctor and published, with illustrations, in the Missouri Dental Journal.

Dr. Morrison belonged to a family of dentists, having an uncle, two brothers, and two cousins who followed that profession.

As a dentist Dr. Morrison kept abreast of the profession and was one of the first to use the mallet and to construct gold crowns. He was one of the first to revive the "planting" of teeth, as he called it, his first cases being reported in 1874; the last report was made at the last meeting of the St. Louis Dental Society he attended, on December 1st, 1896.

Dr. Morrison was a constant attendant of dental societies and belonged to the American, Southern, Miss. Valley, Illinois, Missouri and St. Louis, frequently writing papers, giving clinics and joining in the discussions, also holding office, in those of which he was an active member, having been president of the Missouri and St. Louis, twice of the latter. He took an active part in the Missouri Dental College, filling the chair of Mechanical Dentistry, also acted as demonstrator and gave clinics every session when in the city.

Dr. Morrison traveled extensively for a dentist. July, 1876, he started on a trip around the world, which consumed a year. While on this trip he learned all he could regarding the status of the profession in the country he visited, bringing home with him

specimens of work found while abroad. He also made a large collection of photographs of places visited. These he frequently publicly exhibited in the aid of charity. In 1890 he took a trip to Germany, for his health; again, in 1894, accompanied by his wife, he made a trip to Europe. He has been in the West Indies and also traveled extensively in this country.

Dr. Morrison was a writer for our journals, and many of his articles and items are to be found in the Missouri Dental Journal and its successor the Archives of Dentistry, both of which he aided in more ways than one. Of the former he was one of the editors of the department of mechanical dentistry for four years.

Dr. Morrison was a public-spirited citizen and did his share for the public good. He, at his own expense, placed numbers on the streets on Washington Ave., from Jefferson Ave. to King's Highway.

Dr. Morrison was as well known and esteemed in this country and abroad as any dentist in our city. He was the inventor of the Morrison Dental Bracket, being one of the first put on the market. Dr. Morrison made friends wherever he went, and none ever heard him say aught against any one.

His success was gained by hard faithful work, and he was ever ready to lend a helping hand to his fellow-men.

H. J. MCKELLOPS  
JOHN G. HARPER  
A. H. FULLER } Committee.

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#### DR. JAMES A. SWASEY.

WE are called upon to mourn the death of one whose face will no longer be seen in our midst, Dr. James Atwood Swasey, for many years an active member of this Chicago Dental Society.

This sad event occurred early in the morning of December 24th, at his residence, 3018 Washington Ave., Chicago.

Dr. Swasey had been in his usual good health up to about the middle of November, when he first noticed that he was suddenly breaking, and for a few days he went to the West Baden Springs; but not finding the desired relief, he returned to his summer home in Michigan, and from thence came to Chicago, where he died, surrounded by his family and friends.

Dr. Swasey was the president of this society when the twenty-fifth anniversary was celebrated in 1889. He was President of the Odontological Society of Chicago, in 1894-5; a member of the Illinois State Dental Society, the American Dental Association, and a member of the first International Dental Congress, Paris, France, 1889. He was also the first President of the Chicago College of Dental Surgery, and was re-elected for several years.

We was an honorary member of several dental societies, State and local, in the United States.

The society loses one of its best representatives in the death of Dr. Swasey. He was a man of strong character, high-minded and generous, with a pleasing manner, modest in the estimate of his own acquirements, ever ready to counsel and assist others.

He was a firm friend, a strong partisan, energetic and industrious, an inventor of many useful appliances and devoted to his profession to the last. We will miss his familiar face and hearty hand-grasp, in all of our subsequent sessions.

We mourn with his family in this hour of affliction, and extend our sympathies.

We place these lines of respect to his memory in our journal records, with the thought that his life had been useful to the community where he had resided for so many years, and with the ever present hope and belief in the immortality of his spirit forever and forever.

Be it resolved that a copy of this tribute be sent to his family, and others to the dental journals for publication.

A. W. HARLAN  
TRUMAN W. BROPHY  
F. H. GARDINER } Committee.

## SOCIETIES.

### **Southwestern Michigan Dental Society.**

A MEETING of this society will be held at Kalamazoo, Mich., April 13th and 14th, 1897. Dentists are cordially invited to attend and take part in the meetings.

F. H. ESSIG, Secretary.

### Vermont State Dental Society.

THE twenty-first annual meeting of the Vermont State Dental Society will be held at Pavillon Hotel, Montpelier, March 17-19, 1897.

The Executive Committee are arranging a very interesting program and a good attendance is expected.

A cordial invitation is extended to all.

THOMAS MOUND, Recording Sec'y,

GRACE L. BOSWORTH, Cor. Sec'y, Rutland, Vt.

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## OUR AFTERMATH.

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**LAMBDA CHAPTER DELTA SIGMA DELTA FRATERNITY.**—This chapter was organized, in connection with the Dental Department, Western Reserve University, Cleveland, on January 16th, 1897. The organization was effected by G. M., A. H. Peck; S. W. M., F. H. Zinn; S. S., R. B. Tuller; S. T., P. J. Kester, and Bro. J. G. Reid, of Chicago, assisted by Bros. Whitslar, Jungmann, Stephan, Cook, Wilson, and Bethel, of Cleveland.

The chapter elected officers as follows: G. M., W. F. Spargur; W. M., C. R. Baldwin; Scribe, J. B. Reeves; Treas., F. L. Ludwick; Tyler, D. H. Ziegler; S. P., C. R. Stewart; J. P., F. O. Dudgeon; His., H. C. Kenyon. Drs. C. R. Butler, H' F. Harvey, J. W. Van Doorn and J. F. Stephan, were initiated into the Supreme Chapter.

The Supreme Chapter was organized with Dr. C. R. Butler, president; J. F. Stephan, vice-president, and J. W. Jungmann, secretary.

**CINCINNATI ACADEMY OF DENTISTRY.**—This dental society meets the last Monday evening of each month, except July and August, at the library and reading room of the Cincinnati College of Dental Surgery, Court St., Cincinnati. The object of the society is scientific and social intercourse, reading and discussion of scientific articles, which will particularly interest the modern and progressive dentist, also to create a more friendly spirit among the members of the profession in the city and State. We hope the society will be the means of interesting many who have not been active in society work, and that they will be enabled to send a large delegation to the State Society meetings. Those who are interested can obtain further information by addressing the president, Dr. W. T. McLean, Glenn Buiding, Cincinnati, Ohio.

**A SIXTH CENTURY JAW.**—The curator (Mr. Storer Bennett) acknowledged the receipt from Mr. Horace Farbrother of a lower jaw, supposed to belong to an Anglo-Saxon, about 547 A. D., which had been dug up near Old Sarum. The arches were well developed and the teeth were well formed, without the slightest sign of caries. There was evidence of wear from mastication, and

the wisdom teeth, which were unerupted, were somewhat misplaced. The specimen was an interesting one.—*Dental Record*.

**NEW DENTAL FRATERNITY.**—A new dental fraternity, Phi Alpha Chi, has been established at the Cincinnati College of Dental Surgery. Among its charter members are quite a number of graduates from literary colleges, who were members of fraternities during their courses there. Among the fraternities thus represented are, Alpha Tau Omega, Sigma Alpha Epsilon, Phi Gamma Delta, Alpha Sigma Phi, Nu Sigma Nu, Phi Beta Kappa and others. The new fraternity, Phi Alpha Chi, is distinctively a dental fraternity, formed with the same objects in view as the various medical and legal fraternities now in existence. It starts out under the most favorable auspices, gives promise of a bright success, and it is the intention of the founders to make a national fraternity of Phi Alpha Chi, by entering other dental colleges.

**PERSONAL.**—Dr. Grant Mitchell, formerly of Canton, Ohio, is now associated with Dr. Moore of Allegheny, Pa., under the firm name of Moore & Mitchell.

**DIED.**—Dr. S. B. Brown, one of the prominent dentists of America, died of heart disease, at his home in Fort Wayne, Ind., January 5th, 1897. He was born in 1824, at Marlboro, Vt. He received his dental degree from the Penn. Dental College, 1870, and Ohio Dental College, 1871. He had been president of the Miss. Valley, and Indiana State dental societies, was an active member in the American and others, and was elected president of the Indiana Dental College in 1889. In his death the profession loses an active worker and conscientious dentist.

**DIED.**—Francis Peabody died at his home in Louisville, Ky., January 23rd, 1897. He was president of the Louisville College of Dentistry, a man prominent in the profession, and an active member in many dental societies.

**PATENTS RECENTLY GRANTED OF INTEREST TO THE DENTAL PROFESSION.** Charles O. Perkins, Petaluma, Cal., handpiece for dental engines, 572310.

Arthur W. Browne, Princes Bay, N. Y., dental chair, 573133.

George W. Schwartz and B. J. Cigrand, Chicago, Ill., dental furnace, 573361.

Hamburger & Co., New York City, tooth-brush, trade-mark, 29301.

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Harry A. Edgecombe, Mechanics Falls, Me., dental plunger or mallet, 574025.

George B. Hawkins, Norwood, N. Y., dental disk holder, 574031.

Merrill W. Hollingsworth, Philadelphia, Pa., appliance for bleaching teeth, 574033.

Joseph M. Strout, Portland, Me., dental matrix carrier and retainer, 574012.

Flavel A. Rudolph, Carmi, Ill., dental tool, 574763.

Fred. W. Blomiley, Sioux Falls, S. D., adjustable dental mouth mirror, 574877.

Wm. H. Duddy, Boston, Mass., dental napkin clamp, 675108.

John C. Blair, Louisville, Ky., fountain spittoon, 275629.

Philip S. Malcolm, Portland, Oregon, tooth-powder receptacle,

Louis Wirsching, New York City, veterinary dental file carrier, 575407.

# THE OHIO DENTAL JOURNAL.

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No. 4.

## CONTRIBUTIONS.

### So Utterly Simple.

BY GRANT MITCHELL, D.D.S., ALLEGHENY, PA.

A FRIEND complained to me, some days since, of central and lateral facings cracking off from bridge pieces, after they were in the mouth.

I asked him why he did not protect them from concussion by tipping them with gold. He replied, "in the first place, it is a *good deal of extra bother* (merciful heavens!) and then many of his patients object to the 'unsightly' display of gold."

I have been employing for *several years* a method which is so utterly simple, that it never occurred to me before that all other dentists might not be doing the same thing, and the complaint, referred to above, has prompted me to give a description of the method, lest there may be even others who perchance find it "a good deal of bother" to give their patrons what they *pay for and expect*.

A central, lateral or *cuspid* facing, such as is shown at A in drawing, is ground from the pins to a *smooth, sharp, cutting edge*,

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indicated by the dotted lines "y." Carefully burnish a platinum backing over the surface, allowing the end to project in a parallel line about one thirty-second of an inch.—black line, z, Fig. B.

Invest carefully (so as to just catch the smallest tip of the projecting backing in the investment, to prevent the curling away from the tooth, when it cools and contracts), and flow your gold.

Fig C is the finished result—a gold tip, so easily made, so thick and strong that impact between porcelain and an antagonizing tooth, and consequent fracture, is wholly impossible, and yet may be ground down so beautifully that it is almost if not wholly invisible; or, if it is desired, it may be left thick enough to satisfy the longings of the most ardent admirers of "gold in the teeth."

I must take the precaution to observe again, however, that the projecting backing should not *lap over the end* of the tooth, but project in a straight, parallel line beyond it, or on cooling —!!? \* \* † †.



### Working of Steel.

BY C. R. BUTLER, M.D., D.D.S., CLEVELAND, OHIO.

(Continued from page 7.)

STEEL is manufactured, it does not occur in nature, it is a modified form of iron. Like the word gold, and silver, it has no *L* or *gr* root. It is capable of great hardness and can be made highly flexible but not *elastic*. It is erroneous to speak of elasticity, when describing its properties. As late authority as the Century Dictionary, makes the misstatement. The band-saw or watch-spring is flexible, but not elastic.

You will observe that nothing has been said about the chemical composition or process for the production of steel. Any good work on metallurgy will give all this in detail.

Miller, Metcalf & Parkin, Crescent Steel Works of Pittsburgh, make a very fine tool steel. Stubs steel is very fine in crystal, and in the round rod is most convenient for many purposes.

There are two other English makes of steel of fine grade, for dental instruments; obtainable of Jessop & Sons, 23 Cliff street, and Wm. Jessop & Sons, 97 John Street, New York.

No satisfaction is to be had by enquiring of the manufacturers of instruments for stock steel, that they claim makes the best quality of instruments. *That* is one of *their* secrets. These mentioned makes, I know to be of superior quality.

Having given you the modes of handling the raw stock, and several makes of steel, you should be ready to take up the pointing of the various kinds of instruments that are needed in daily practice. Especially the repointing of such as may be broken or worn out.

A bench anvil, small riveting hammer.—the S. S. White pattern B, or Dr. J. G. Lane's for crown and bridge-work, are about the right size, blow-pipe, and alcohol lamp are necessary. The gas flame may be used, but for heating of small points, the alcohol flame is the best for amateur workers; some fine cut files also are needed.

With a little practice good forms may be secured with the hammer, that will need but little filing for final sharpening; especially in most hand cutting instruments, such as chisels and excavators, yet, if you wish to secure the very best cutting edge or points, an extra size of point should be left, to be ground away after it has been hardened and tempered. You may desire to have an instrument with an expanded end, this may be secured by holding the point in the flame, and giving it a few quick strokes with the hammer upon the end—this is termed upsetting.

Plugger points must be nicely finished up to shape before serrated, hardened or tempered, unless they are to be *smooth* points, which I prefer to grind down with the oil stone after tempering.

The serrating of plugger points requires skill and care; you should have an engravers' stand to hold a magnifier. The jewelers' slotting or screw head file is a good form, they are about three and four inches long, and are of two grades of cut, and you should be careful to select one that is straight. They should be ground both edges on the same side, at a long or short bevel to a knife edge, that you may be able to cut the valleys with equal slope by bearing to the right, or left, with the file cut sides, on straight surface points, whether it be in fine or coarse serrations.

In starting the serrations, draw the file gently across the face of the plugger at right angles to it, giving equal distance to the cuts, then the cross cuts the same. If the face of the point be such as to require the teeth to rake or slope forward, the file cut side should be leaned toward the point of the instrument. *Small* points, and for pits and grooves, should have but one valley, or two, as a crucial cut.

These files may be first ground on a fine corundum stone, from the center *toward* the edge, then finished on the Arkansas oil stone; once prepared nicely they should not be used on other work. And if you want a nice free working point, the valleys should be carefully polished out after they have been tempered; which may be done with a knife edged piece of clock spring, using diamantine or *flower* of corundum and oil.

Manufacturers put great stress on the superiority of stoned burs, (which is well) but I have yet to see any such claim for serrated plugger points by them.

You will remember the caution given, not to over heat the steel at any stage of the forging.

We have now come to the stage most difficult in the production of edge tools:

#### TEMPERING.

This is an acquired art, and cannot be *told* or given in any *written* description only in general terms; one of the principal difficulties is where varying degrees of hardness or temper in the same tool or instrument is needed; this being the case in nearly all dental and surgical instruments, it is no wonder there are so many useless ones in the market however nicely formed.

It is a two-fold process, first the instrument must be carefully heated to a red heat, and quickly plunged into water. This may be termed the simple method to *harden*.

A pot of lead on the forge or gas furnace, is a convenient way to heat *slender* instruments for hardening, such as canal pluggers, etc. It is well to protect the surface to prevent oxidation while heating. This may be done by the use of fine soap, pulverized prussiate of potash, or the following mixture: Gum arabic, rye flour, cyanide of potassa, and charcoal flour, in a paste. Warm the instrument, then smear the point in the mixture, which not only protects the joint while heating, but the instrument will

clean more readily for showing the development of colors in the process of *tempering*.

The point or blade of excavators and chisels should be grasped with heavy pliers to protect from heating, then with the blow-pipe direct a small flame upon the *shank* at the upper line of the hardness, carrying the color toward the *angle* or blade to a blue, or high spring temper. Attempts have been made to illustrate these colors that give the varying degrees of hardness that is needed in different instruments: Extra hard, is grayish white; pale yellow, for chisels and heavy excavators; straw color, face of pluggers and fine excavators, bringing the purple into the angle, or near the point, the heavier the point the higher the temper may be allowed. Plunger points must be at least a high spring to prevent bruising; burnishers, *hard*, unless they be quite thin or slender like canal pluggers, then a spring temper must be given them.

Dr. H. L. Ambler, was the first in Cleveland to make dies for making clamps. They were hardened in oil, the oil being burned off to temper to a spring. Some steel stands a higher temper than other—this can only be proven by a few trials of the stock.—If you wish to blue the shaft of instruments, which gives them a very nice appearance, it may be done after the points are finished, and the shaft finished to a smooth bright surface, then wash the instrument *clean*, grasp the point well up the shank in lead pliers, made by bending the bar so as to make beaks to grasp the point, then pass the shaft through the flame, or lay it on a bar of heated iron, roll it over until a nice blue is developed, then cool in the air and you will have a nice looking instrument.

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### A Good and Quick Way.

BY W. H. BROWN, D.D.S., NASHVILLE, TENN.

THERE has been so much written and said in regard to sterilizing instruments, that I thought it worth while to give my method, which I think is a good one as well as one that does not require but little time. In addition to the one I am going to give, you can at leisure boil or use any prolonged method you see fit.

My method is to get a tall, large mouth bottle, one that will hold about four ounces, about four inches tall, and fill it about half full of water, into which put about four bichlorid of mercury tablets, or enough to make a very strong solution. This bottle is kept open, setting in a very convenient place. As soon as I am through using an instrument, before putting it back in the drawer, I dip it in the solution and lay it down on the bracket table without wiping it off. After I am through with my patient, my assistant takes a wet napkin, wipes and dries the instruments. This, I think, is sufficient to destroy all traces of infection.

As far as perfect safety or perfect sterilization is concerned, it is impossible, for microbes are everywhere if they are anywhere at all. They get all over your chair and clothes, they are on the knobs that you use in adjusting your chair, in fact you cannot use anything that is not covered with them: then, how can you keep them off your instruments? The only thing we can do is to be sure there are none on the points of instruments at the time of their immediate use.

Another thing I would like to speak of along this line, and that is in regard to the hypodermic needle. I noticed in your January edition an article on "painless extraction," in which Dr. W. D. Snyder says that if he were going to a dentist to have a tooth extracted, he would take a new needle. Now, if the doctor would be perfectly safe, he had better take syringe, fluid, needle and all, for how is he to expect a syringe to be perfectly clean when even the bottle that contains the anesthetic is liable to be full of germs? Why should there not be some in the syringe, when at each insertion the needle is dipped into the bottle and filled again? Are microbes too large to go through a hypodermic needle; or do they get drowned in the solution? Who will suggest a way to overcome this difficulty?

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### Syringes.

BY M. G. JENISON, D.D.S., SAN ANTONIO, CALA.

WITH the progressive dental practitioner one of the most useful instruments is a good syringe, for the treatment of many of the pathological conditions which we find occurring in relation

to the oral cavity, for dentistry consists of more than extracting teeth, making artificial substitutes, and filling the cavities of decay.

Hundreds of teeth are even now lost every year from other causes than caries, although many are now saved which but a few years since would have been consigned to the forceps.

In the subject of pathology we can look for some of the most rapid advances in the line of real progress in dental science, the dentist here being called upon to check many diseases, that, if allowed to continue, would end in the loss of the teeth, which at the same time may not be in the least affected by caries.

Take the forms of Riggs' disease, necrosis and caries of the bone, alveolar abscess, in its various forms, diseases involving the antrum, and wherever we find sacs or pockets with or without sinuses, we there find conditions which can only be thoroughly treated by the use of the syringe, and by one which will carry a cleansing and remedial agent with sufficient force and quantity to thoroughly cleanse and medicate the parts.

In treating the above mentioned conditions with many of the small syringes in use, about the only result obtained is to incorporate with the serum and pus a small quantity of some anti-septic agent, which does very little if any good, as it scarcely reaches the surface of the membrane at all, certainly not in the form in which it is intended to be applied. In all such cases to obtain any satisfactory result, the diseased surface must be thoroughly cleansed first. Then, with proper application of remedial agents, and giving nature a fair opportunity, we hope for many more cases of cure instead of failure.

The trouble with a piston syringe is it is often partially or wholly out of order at the very time it is wanted for use, and the busy practitioner, although he may be perfectly conscientious in his intentions, will in his hurry, frequently omit the treatment at a time at which it should be given, or he will, with his imperfect appliances, make either a partial or complete failure of the attempted operation.

Another objection is the liability of leakage around the piston, where it enters the cylinder. The unpleasant results are unnecessary to enumerate. Nearly all of the syringes which have been placed upon the market for the use of both the medical and dental professions, have been operated on this principle,

all being subject to the objections already named. Of course, however, many of these can be avoided by special care in regard to keeping the packing at all times moist, so that it will not shrink; but it is just this care which the majority of them never receive, and although the syringe and the principle on which it is operated may not be to blame for this fact, it does not do away with the truth that it does exist, and it is easier to find some means to overcome this shortcoming in our proceedings than it is to remedy them.

Those syringes composed of a tube with a point for injection and a rubber bulb at the opposite end, for convenience and ease in operating and efficiency in action, are far ahead of those already mentioned. About the only objection which can be urged against them is the comparative slowness with which they can be charged, if carrying a small point, unless the point be removed each time of filling; and if a variety of medicines are to be used, we find another difficulty in thoroughly cleansing the instrument when changing from one agent to another, and in an active practice these wasted minutes mean dollars and cents, and oftentimes there is a partial or complete failure of the object sought for in our hurry to complete the case and see the next patient. We can see but one means of avoiding these objections and that is by employing air pressure to carry the cleansing and remedial agents to the points desired. With this there are no packings or rubber bulbs to become leaky and allow the medicine exit onto the operator or patient. If the bulb giving the air pressure fails, it will be at a point where it will involve no trouble further than the necessity of supplying a new one.

The receptacle containing the remedies can be of such size as to hold sufficient quantity for the requirements of all the various cases that we may be called upon to attend. The air pressure can be brought into the receptacle in such a manner that if any of it does pass through the diseased part it will pass through the medicines and be cleansed from all disease germs, thus causing no injury.

The power from the bulb is under such perfect control of the operator, that any desired quantity of the liquid in use can be carried to the affected part. The action can be made so simple and easily controlled that the instrument itself will be moved but slightly, so that the point which may be in contact with the

tender and diseased part, will give no added irritation, while being used. It is too often the case in many of our procedures that in the use of nearly all of our instruments, we lose sight of principles in working on parts, the thought being "How is a certain operation done," not "Why?" If this stumbling-block could be removed from our professional pathway the results would be far superior and far in advance of what we see in every day practice. Then would we come nearer being a scientific profession, and never subject ourselves to being classed as mechanics; though, of course, we cannot and do not want to avoid mechanical principles, as they have to be constantly applied; but if we make mere machines of ourselves we cannot intelligently apply even these, and in the question of the syringe alone let us first know what we want to use it for; why we use it; how it should be made, so that we can use it to the best advantage, and then see if some of the results obtained from this little instrument, alone, will not do much to advance our own success and give our patients much more satisfactory results in these particular lines of treatment in which the use of this is indicated.

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### Capping Exposed or Nearly Exposed Pulps.\*

BY DR. W. A. LEE, ALLEGHENY, PA.

VARIOUS methods have been advocated for pulp capping, and the advocates claim to meet with universal success; they are ever ready, also, to condemn every other method. It is not my intention to condemn any method, but to give you what practical experience has proven to be successful in my practice.

First, I will describe my idea of a pulp cap. It must be a disinfectant, an antiseptic and antiphlogistic, and most important of all, a non-conductor of thermal changes. It should invariably fit closely and accurately the surface to be covered being at the same time firm and unyielding.

As a disinfectant I have found nothing better than pure beech-wood creosote.

As an antiseptic and antiphlogistic, iodoform has proven the best.

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\* Abstract of paper read before the Odontological Society of Western Pennsylvania.

As a non-conductor capping material, I have found gum-copal, dissolved in sulphuric ether, the most satisfactory.

In capping exposed or nearly exposed pulps, apply the rubber dam. If possible, open the cavity, so as to give a good view of the interior; remove all debris and softened dentine, being careful not to impinge on the pulp. I now take my disinfectant (creosote), saturate the cavity with it and wipe dry. Iodoform is introduced, followed by the application of copal ether varnish, a little thicker than cream. This is applied with a small pellet of cotton and dried with warm air blasts. A number of coats may be applied if desired. When the tooth is not sensitive to a blast of cold air, it is sufficiently lined. If the exposure is large, I always place a piece of asbestos paper, cut to shape of the floor of the cavity, into the varnish before it hardens, pressing it down gently, then revarnish over the asbestos and dry. I then place a thin mixed paste of oxy phosphate of zinc in the cavity over the cap. This, however, should never be pressed or forced into place, for injury may and is almost certain to follow any compression of the pulp. The cement must set thoroughly before filling with either gold or amalgam. Besides being a non-conductor, and adapting itself perfectly to the surface covered, it protects the sensitive tissue from the irritant action of the phosphoric acid used with the cement. This is the best method of capping that I have yet found the material being a non conductor of heat and cold, soothing to the pulp, and a preventive of all inflammatory action.

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### Science as Applied to Dentistry.\*

BY M. G. COVEY, MINNEAPOLIS, MINN.

AS THIS subject is such a very broad one, one might write volumes and then not cover the whole of it, therefore I will give only a few of the general heads and leave the details to be brought out in the discussion.

Perhaps not more than thirty years ago false doctrines of all kinds easily found belief and currency, because the real information was lacking. But science is not satisfied with a know-

\* Read before the Students' Society, College of Dentistry, University of Minnesota, Minneapolis.

ledge of isolated facts merely ; on the other hand it groups those which are related together, shows what their relations are and deduces laws which govern these relations. And the test for these scientific facts is, as Dr. Daniel G. Brinton tells, " that they shall have unlimited and untrameded investigation. They must be not only verified, but always verifiable. They welcome every trial ; they recoil from no criticism, higher or lower ; from no analysis ; from no skepticism. They challenge them all. They ask no aid from faith ; they appeal to no authority ; they rely on the doctrine of no master. The evidence and the only evidence to which it appeals, or which it admits is that which it is in the power of everyone to judge, that furnished directly by the senses. They deal with the actual world about us, its objective realities and present activities. . . . The only conditions that it enjoins are that the imperfections of the senses shall be corrected as far as possible and that their observations shall be interpreted by the laws of logical induction."

And were it not for science the dentistry of to-day would be the same as that practiced in the early part of this century. It has been said that of late years the development of dentistry has been so rapid that at least once in five years a new science is born and likewise a new generation of dentists arises to practice the new art. Indeed, so fast we move that it might be said it was but yesterday the scientific man spoke and to-day we have the practical application of his discovery.

But too many have a false conception of what science really is. Simply and exactly, science is knowing.

Now comes the question, what is know concerning dentistry ? Well, from the science of anatomy is learned the distinct parts which come under the observation of a dentist for treatment. And how very necessary it is for one to know the structure and composition of the tissues of these parts, in order to deal intelligently with them. But, fortunately for people nowadays, instead of spending their time in scientific research, in order to ascertain these things, they have only to study the productions of men who have already devoted their lives to the science of histology. Then from the science of physiology we gain the knowledge of the origin, the embryonic condition, nutrition and development, the changes of form and structure, arrangement, relation to contiguous parts, functions and special use as regards the entire phy-

sical economy of the body, modified by peculiarities of anatomical structure.

Next comes the most essential science that one must understand to be a success as a dentist, and that is pathology. Not to fully understand all pathological conditions is to sacrifice hundreds of teeth, and the loss of other tissue quite as important.

As a necessary means of correcting these diseased conditions they must be rationally treated. And it is right here the knowledge of the science of *materia medica* and *therapeutics* is going to be of service.

They treat not only of all substances natural or artificial which are used in the cure of diseases, but also the application of the remedies and curative treatment of diseases. In fact, they are an embodiment of history, chemical nature, medicinal properties and therapeutic action of all substances used in modern days as medicines.

However, all tissues cannot be restored and must be replaced, as, for instance, the teeth. In doing this, the dentist has many sciences which aid him, either in selecting a material suitable to replace the lost tissue, or in manipulating the material to be used.

From chemistry is learned the composition of natural substances, the properties of elements and of the compounds formed by their union, the laws which regulate the combination of the elements with one another and to which their compounds are subject in their mutual actions.

Besides these we have metallurgy, electrolysis, bacteriology, and many others, all of which are important.

But there is one which I think needs special mention, since it has not been used much until quite recently, and that is orthodontia. At first it consisted of correcting the simplest of the deviations from the normal articulation or occlusion of the teeth. But the growth and progress has been so rapid that, at the present time, it is possible and even usual, to rectify the most marked and excessive malformations of the dental arch.

Then there are the sciences which enable a dentist to perform his operations with greater ease and with less pain to the patient. What would a dentist of the present time be without some of the many anesthetics, whether local or general?

Then there is the science of electricity, which is fast coming into prominence in dentistry, not only as an aid to the dentist in

doing more rapid work without much effort on his part, but also as a cure for some of the pathological conditions and an obtundent for pain.

Who knows but that the next generation will find a use for the X-rays in dentistry?

But after all, the important factor is that investigators are bringing to light new truths and facts every day, along all these scientific lines, and the dentist who is alive and active must keep in touch with these things, or else he must needs drop behind the times and be a back number as it were. But what is the result of the scientific man's research in dentistry? It is simply this: He has lifted dentistry out of the slough of mystery and planted it on the firm ground of true knowledge. In fact, the cultivation of the higher branches of science has the tendency to broaden the field of technical knowledge and make dentistry more exact in procedures and more certain in results, thus causing dentistry to be a profession or a specialty.

#### DISCUSSION.

S. W. SHANKLAND: The rapid progress of woman in the last century is a marvel, and the world is indebted to her for many a lift and good turn.

The author of such a brilliant paper is doing much favor to both science and sex, and is deserving of the most worthy compliments.

Throughout the college course she has made a record in our branch of science that will serve in future as evidence that marriage is a failure, and we hope that when she is in the midst of a lucrative practice that she will at least take a boy or two to raise, just to show her appreciation of her progress. Many members of this society will present themselves for adoption I have no reason to doubt.

The paper stated that volumes might be written upon this subject, and true it is. The vital points have been covered in general, which was the author's purpose rather than to take any one of them up in detail.

The condensed definition of science, as given, was knowledge, and although this is good, I have noticed that in the list of synonyms for science, that art comes first and knowledge follows. Now, as to this word Art, it surely has not been mentioned once

during the entire discourse, and as I realize its great and important application and relation to dentistry, I will base my discussion upon this omitted principle.

As art is related to science and dentistry, just as closely as a man is related to his wife, it comes to me as natural to talk about the neglected art, as it is natural for a person to talk about a neglected wife. But there is (you might say) some difference between science and art. This will be taken up later.

The topic of the paper was not art as applied to dentistry, I know, but the science part has been so well covered that the only thing left for me to do is to contrast the relationship of science to art or art to science, with dentistry as the attraction sphere.

The sciences particularly mentioned by the lady were anatomy, histology, physiology, pathology, *materia medica*, therapeutics, chemistry, metallurgy, electrolysis, bacteriology, orthodontia, and a reserved seat in the gallery for the X-ray.

"Many others might have been mentioned," as she said, and one that should be mentioned is surgery, of which we are enjoying an excellent course, for few classes have access to hospital clinic and are compelled to attend operations upon the head and face, and the oral cavity in particular, that we are privileged to attend. I am glad to see a closer relationship springing up between the general surgeon and the dental surgeon. It is very often that the knife and the trephine come into use to cut away offending tissue and irritating parts from the oral cavity, before supplying a patient with the dental substitutes that may be needed.

This branch of science is of such importance to dentistry that it holds a prominent place in the degree of D.D.S. The general knowledge of the sciences mentioned and studied in the college course will permit me to "pass them up" and proceed with some outside the curriculum.

*Architecture* is one. A dentist must plan his work; his columns and arches; his excavations; his cavity proportions and must see in his mind's eye the completed structure of perfection from positions in perspective, profile and relief.

*The goldsmith's art* he must be versed in, that he may know the constituents of various metals and solders, also their conduct and peculiarities under the flame. He must know the various alloys and their properties, and be able to at least tell gold from brass, remembering that it takes brass to get your gold.

*Mechanics* are essential in orthodontia in particular, also the principles of forces taught in physics and philosophy must be understood, for you must know how to arrange pull-backs, stays, rotators, retractors, etc., etc.

*Masonry* is important, for there are cement walls to build and miniature cellars to floor, post holes to fill, crowns to set, and various duties of this nature.

The dentist must be an artist at wax working, and familiar enough with the culinary art to cook both rubber and mercury at the same time.

The sculptor art is also a requirement, for there are cusps to carve of plaster and modelling composition. One must be dexterous with the chisel, mallet, spatula and knife. Must be able to restore lost dental organs that will harmonize with the patient's general make up as to color, size, shape and form.

He must also, as a freshman, delve into the muddy mass, and by twisting and patting that which sticks to his fingers, be able to produce a typical tooth form.

Now, in regard to the appliance of science and art to dentistry. The author of the paper made the statement "that was it not for science dentistry would be where it was thirty years ago." This is unjust, for art is equally responsible for the advancement of dentistry, and should have proper credit. Art relates to *something to be done*, while science relates to *something to be known*. Is it not more important to be able to do the wonderful and skilful operations of dentistry, than to have merely a knowledge of them? Art in an industrial and mechanical sense must be distinguished from art in the esthetic sense. The chief aim for the former being utility and the latter being beauty. But both of these must be well considered in dentistry, taking each and every branch into consideration.

No rules can be given that will cover all cases, and likewise no rules can be given to produce a great painting like Raphaellos' Transfiguration, or the statue of Apollo, or the poem Iliad. Science and art you see are very closely related and science would never have advanced as it has in chemistry and electricity, was it not for the assistance afforded by mechanics and arts. It may also be said that art could not have advanced to its present high standing without some assistance from science. The one has urged the *advancement* of the other, and the continued competi-

tion has caused the *advancement of dentistry*. It was not due to science alone by any means.

The classes of science that interest the dentist most are—

1st. Absolute science which treats of a definite knowledge of things as they actually exist.

2nd. Abstract science refers to theoretical or pure science.

3rd. Active science is systematic science put to practical use.

4th. Applied science. That science which uses general principles to explain classes of actual phenomena.

These four classes it seems to me are embodied and climaxed in the one word—art.

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### Union of the American and Southern Dental Associations.

BY THOMAS FILLEBROWN, M.D., D.M.D., BOSTON, MASS.

THE American Dental Association was formed as a more perfect organization to succeed the American Dental Convention, which it soon supplanted.

The Southern Dental Association was organized to supply a need which can now be better met by one large truly national body.

Both Associations have done good work, and each has supplied a want existing in the professional life of this nation.

Both have been practically local societies, though ostensibly national. The Southern has been limited by its name and its practice. The American has continued too much as an Eastern institution, and has hardly kept pace with the march of progress. Its methods no longer serve its best interests; and there need be no surprise at the loud call there is heard for a reorganization and the adoption of methods that shall infuse new life into its councils.

The vital question to-day is, how to form and organize a society which shall be truly national, and serve the needs of the dental profession of this country.

The most natural course seems to be a union of the American and Southern Dental Associations in one strong, national society, with a constitution that protects all interest, invites the best efforts of its members, and provides for progress and enlargement in the future.

The profession united in one national association will respect itself more than it can when divided, will be more influential at home, and thus be able to do more to elevate professional character, and make the influence of the dental profession in America more potent in all its relations with the world.

The social element is one of the most powerful forces for the progress of humanity, and this will be greatly strengthened by union. Only few men feel able to afford the time, to say nothing to the expense to attend two series of meetings in one season both serving the same end, hence under the present dual organization many are deprived of the satisfaction and benefit of personal acquaintance. In one association the members from the East, South and West will come together at regular periods, compare experiences, offer mutual suggestions, and enlarge, deepen, and strengthen their personal relations. All those who were fortunate enough to attend the union meeting of the American and Southern Association in Louisville in 1888 realize how pleasant it is to dwell together in unity.

By union the importance of the State societies will be enhanced; as the meetings of the larger body in each section of the country will be less frequent; the leading men of each State will naturally interest themselves in their home societies and make their proceedings more valuable, and thus be more able auxiliaries to the National Association.

In 1894, at Old Point Comfort, the American Dental Association appointed Thomas Fillebrown, J. Y. Crawford, Louis Jack, B. Holly Smith, and J. N. Crouse a committee to promote the cause of union of the two Associations, and invited the Southern Dental Association to appoint a like committee for the same purpose.

In response to the invitation the Southern, at its meeting in Atlanta in 1895, chose Drs. L. G. Noel, E. P. Beadles, J. T. Calvert, F. Peabody, and J. R. Knapp, a committee to consider the subject with the committee of the American. These committees have sought to obtain a concensus of opinion as to the desirability of union and the essential points of a plan which would prove acceptable to the members of the Associations, which would protect the interest of the minorities, and at the same time provide the best working plan at the present time possible.

At first considerable opposition to the movement was ex-

pressed. The opposition seemed based upon the fear that rights would be denied the minority and also upon affection for the old Associations. As the matter has become better understood opinion has been more and more favorable to the movement. The votes of both Associations, although not decisive, have invariably been favorable to a union.

A plan including the following provisions meets with quite general acceptance.

1. It seems desirable to take a new name, one distinctly national; just what it should be has not yet appeared. The committee invites suggestions from any member interested.

2. Divide the country into divisions, South, East, and West, and meet alternately in each section. This will insure a meeting in each portion of the country every third year.

3. Organize the new Association in sections the same as the American is now, but have the president (or executive committee) appoint chairmen known to be competent and interested to do the work. It is believed this would lead to more effective and better work. Often in the past but few would be present at the organization of the sections, and men neither fitted nor interested would be chosen to official positions.

A return to the old committee plan has been sometimes advocated. This plan has been followed in the Southern, and the results of the past few years has not been especially encouraging for its adoption in a new Association.

The plan of sections above proposed contains the essentials of the committee plan, but it makes it obligatory upon every member to join one of them, and insures an efficient head to organize and lead the work.

5. A more intimate relation with the State societies may be promoted by providing that they become practically branches of the National Association, and also by making it the duty of societies sending delegates to make a report of the year's work of the society to the Association.

6. Provide for membership of permanent delegates and honorary members as the American Association does now.

7. Choose a president at large, or from the section in which the last annual meeting was held.

Choose one vice president from each section, the vice-presidents to be of equal rank, and not first, second, and third, as is now the case in both Associations.

8. To many it seems desirable to change the date of the meeting to some time in September, so that members will come fresh from their vacations ready for work, instead of tired out at the end of an exhausting year. The change would also avoid the excessive heat of August.

While the College Faculties Association and the National Board of Dental Examiners have done a great work for the uplifting of the profession, they have thus far been a direct injury to the interests of the National Associations.

The Southern has suffered because so many of her members have necessarily neglected its meetings to attend the meetings of the Faculties and Board of Examiners which have been held at the same time and place as the meetings of the American. The American has suffered severely by the meetings of the Faculties and Board of Examiners overlapping its meetings and absorbing the attentions of otherwise active members.

This can be remedied in one of two ways, either by the Faculties and Examiners meeting at another time than that of the National Association, or by the meeting being held a week earlier at the same place as the National Association. The latter plan is very likely to be tried the present year, and its effects can be then properly estimated. It is quite reasonable to expect the meeting of the Faculties Association to be called as early as Friday before the time of the meeting of the American and the Southern Associations at Old Point.

If the Board of Examiners shall also meet early, the work of these bodies will be completed, and the members be left free to engage in the work of the National Association.

This is certainly one of the most important considerations for the interests of all concerned.

Dr. W. C. Barrett, at the last meeting of the American Association, and Dr. A. H. Thompson, in an article in a late issue of the *Dental Practitioner and Advertiser*, and several other interested members, have expressed the conviction that division associations should be formed to meet annually as many parts of the national society. It is undoubtedly a wise and desirable thing to do, and it seems now quite possible to carry out this idea by providing for it somewhat as follows:

1. The members of each division South, East, and West may form one or more branches to meet annually except the year the National Association meets in the same division.

2. Each branch shall manage its own affairs subject to the constitution and regulations of the parent society; elect its own officers and pay its own incidental expenses.

3. Each branch to receive delegates from societies within its limits, and they shall have the same standing in the National Association as those joining direct from local societies.

4. The proceedings of the branches to be sent to the National Association for publication in the transactions of the year.

The details of a plan to accomplish this result can be arranged which will not interfere with the customary working of the National Association. This plan will prevent the destruction of the present societies, and thus remove the principal objection that has been raised against union. One branch would be practically the Southern Association, and the Eastern would include a large proportion of the American membership.

The West might reasonably form two branches. The Western branch and the Pacific branch. Eventually the best interests of the profession may be served by making four divisions of the country. At present we shall probably better succeed with three.

This article does not presume to be exhaustive but only suggestive.

The discussion of the subject will show us the best way.

The committee has no plan nor desire save to formulate the wishes of the members of the two associations and invite suggestions as to the points mentioned, or any other which it seems desirable to have considered.

## ALL SORTS.

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### A Fertile Cause of Defective Teeth.

Dr. Wm. H. Richards, president of the Southern Dental Association, says: "Dentists and physicians, in my judgment, do not recommend or prescribe as often as they should the use of suitable preparations for the care of children's teeth. If a proper and agreeable preparation be kept constantly in the nursery the little people would soon take a pleasure in its use, merely for its pleasant after effects. Thus, through the apparent play with the detergent, they are paving the way to sound teeth and

healthy gums, besides keeping the secretions of the oral cavity free from unhealthy contamination before entering the body.

I have been trying for a long time various preparations of the kind, with a view to settling upon something which I could recommend to my patients without inviting reflections upon my judgment. With this end in view I critically examined the Euthymol Tooth Paste, manufactured by Parke, Davis & Co., and I feel safe in saying that I can direct the use of this preparation without expecting anything but good results."

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### Enamel Margins.

In an article in the *Stomatological Gazette*, Dr. Schuhmacher says; "Nothing is more fatal to the longevity of a filling than the failure of enamel edges, and how often do we see beautiful fillings marred by a fracture or failure of the enamel at the margin, to repair which means to weaken the filling and often necessitates removal of the entire filling, rendering the original work of no avail.

First, in regard to the extent of cutting away the enamel, we must consider accessibility to the cavity, appearance and strength, and we may say retention, although I believe we all agree that a filling dependent upon enamel walls for retention is indeed a weak filling,

Different rules are to be applied to the different teeth, as we would not follow out the same rules in molars as in incisors.

In all cases of approximal decay in molars and bicuspids the enamel edge should be trimmed away so as to have all edges of the filling accessible to the explorer point, and after the teeth have resumed their natural position, the point of contact should be upon the body of the filling, and not at the union of enamel and filling.

This may seem in some cases like sacrificing appearance for the sake of durability; but I think such a course much more commendable than sacrificing durability for the sake of appearance.

There are many carefully inserted fillings which have failed at the edges, which would have held longer if the enamel edges had been trimmed away more generously.

The patient probably wanted amalgam used, considering the saving of time and money, but at the same time objected to showing much of the filling on the buccal or labial side. The result is that the buccal wall is generally undermined by decay in the course of time, depending on the quality of enamel and dentine, and so must eventually be cut away to a greater extent than would have been necessary had the enamel been trimmed away more in the first place. So, by all means, see that when

the operation is completed the explorer point can be passed over all edges, thus insuring a self-cleansing surface.

We cannot always please our patients by allowing them to dictate to us in this regard, or in others. Our own judgment should prevail in all cases, and if a patient wishes to dictate let him understand then and there the matter of responsibility.

Where we have very hard dense teeth, of square shape, the approximal surfaces of which are almost flat and fitted together like a row of bricks, we would find it difficult to extend small cavities so as to bridge the edges free from contact with the neighboring teeth. In these cases we must necessarily leave the larger part of the cavity hidden.

But here we see exemplified one of the rules of an all-wise Providence, such teeth as just described being, as a rule, of the very hardest structure and in the mouth of a well-organized and healthy patient.

But no matter of what shape the teeth, if they seem to be of loose structure with chalky enamel, the enamel edge should be carried out to where it would be self-cleansing, subject to the action of the lips, tongue and cheek muscles.

It is perhaps difficult to describe variously shaped cavities without the aid of charts and diagrams, but as we are considering only general cases it is perhaps unnecessary.

One very important phase of the work here presents itself—the disposal of overhanging edges of enamel, cusps, etc.

In a large approximal cavity in a molar or bicuspid the temptation is often to leave the cusp intact and depend upon oxyphosphates to strengthen the same. But a large proportion of such cases will present themselves in time with the cusp entirely gone, not so much from recurrence of decay, but on account of the enamel having split at its weakest point. It is safer to use the chisel freely and depend on a liberal groove cut into the grinding surface for retention. By making such retention we can fearlessly trim away all weak enamel and not have to depend upon deep cutting into sensitive dentine.

In incisor fillings, speaking of approximal decay, the majority of failures are at the palatal edge, especially when this edge has not been carried down so as to be accessible from the palatal side.

Where the cavity is of considerable extent it is safer to use the chisel freely from underneath, so as to have sufficient room to fill partially or wholly from that side, as the case may be. At any rate it is a great advantage to be able to finish the palatal portion of the filling from the palatal side, and where this trouble is taken the result generally repays the effort.

In regard to the treatment of the very edge itself, the rule is to

bevel all enamel margins, and I think every careful operator bevels enamel edges to a greater or less extent.

In small shothole fillings, we are often tempted, on account of the ease of the work and its simplicity, to leave the edge as it is left by the bur; but it is in just these easy cases, where confidently working speedily, we shatter the enamel edge at one point or another.

By thoroughly beveling the edges of all cavities, large or small, we avoid the common cause of failure in gold fillings, the shattering of the enamel edges with the plugger-points."

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### Regeneration of Bone.

As the result of an experimental research on this subject, Margarucci finds that bone, as far as concerns its nutrition, is dependent on the periosteum and medulla; as far as concerns its regeneration it is under the influence of the deep osteogenetic layers of the periosteum and the peripheral layers of the medulla. Bone regeneration may be verified even in the Haversian canals when the osteogenetic cells penetrate there, whether from the medulla or from the periosteum. Regeneration may take place quite apart from any inflammatory process; it is the effect of a specific hyperplasia. Direct ossification was the rule in the experiments. The results of simple contusion, momentary displacement, and permanent removal of the periosteum were observed and recorded, also the effect of the destruction of the medulla.—*Il Polyclinico.*

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### Continuous Gum.

Continuous gum is, *par excellence*, the denture of to-day. The strongest, most durable, most natural in appearance, most healthy to the oral tissues, and most cleanly of all full dentures.

The matter of weight I do not consider a factor in making an upper denture. If the case be properly made and adjusted in the mouth, the patient does not realize whether it weighs a pennyweight or an ounce. This I can affirm after forty-three years' use of the continuous gum denture.

The impression should always be taken in plaster. No vacuum chambers nor suction devices of any sort are needed. Cases may be made for the flattest, ridgeless jaws and the highest vaults. The only change in the model, as a rule, is a "relief" over the hard palate of a thin film of wax, extending well onto the anterior ridge and nearly to the posterior margin of the plate, so as to prevent rocking of the plate.

In this work, as in all others, the plate should be worn as high as possible, over the cuspids higher than elsewhere. The margin should always be wired with a flat wire soldered edgewise to the plate, beginning at the right side and soldering an inch at a time, making a *close* joint. This is easily done, using common iron wire for clamps, clamping at two points first. The posterior margin of the plate should be reinforced with a doubler, one-quarter inch wide, gauge 30, extending around the tuberosities. The inner margin of the doubler should be turned up a very trifle, to protect the margin of the porcelain. This turned-up edge should extend only to the top of the ridge, where it is met by the wire of the outer rim. The doubler should be soldered first. The wire should not run across the heel, as it is unsightly and unnecessary. A mere trifle of borax is needed simply to guide the flow of the solder. The solder should always be twenty-four carat gold.

In arranging the teeth the roots can be cut off when necessary with side-cutting pliers. Little grinding is needed, just sufficient to let the tooth rest on the plate.

Invest in plaster and asbestos, equal parts, first applying a thin coat of plaster to the teeth, filling the interstices. After removing the wax, make patterns of lead (Japan tea lead is the best) in three sections, one covering the anterior teeth and the others the posterior, butlapping over the cuspids, so when soldered it is a continuous backing, firmly anchoring the teeth to the plate. There should be a foot-piece to the backings about one-eighth inch wide, lying flat on the plate. The backings may be the same thickness as the plate. By slitting the foot-piece several times it can be the more easily adjusted. For pressing the backing into place I use a worn-out rubber scraper. Use very thin twenty-four carat gold for solder, cut in pieces three-sixteenths inch square, picking it up with a sharp-pointed instrument. No borax is needed, as the gold is laid under the foot-piece and under the pins, which are bent down close to the backing.

When using a coke or oil furnace, I soldered in the furnace. Since using the electric furnace I heat the case as hot as possible over a gas heater; then solder with the compressed air or an automatic blow-pipe. When cold, remove the investment after soaking; wash thoroughly; no soap or alcohol is needed.

I use the Close materials for body and enamel exclusively, as they are thoroughly reliable. The first application should be made very wet, so as to be easily worked into all the interstices around and under the teeth back of the backings, jarring with the spatula, and absorbing with a cloth all excess of moisture. Absorb with the cloth most of the moisture from the material in the dish, and apply with the spatula (which

is straight and pointed at one end, curved and pointed at the other, and the only steel instrument needed), holding the case upside down. The material should be packed hard, building up to the full contour, always fullest over the cuspids; jar with the spatula to bring excess of moisture to the surface, and absorb; then dry partially over the Bunsen burner or spirit-lamp. For trimming and contouring, nothing equals a quill toothpick, thin and flexible, which trims around the necks of the teeth and removes all material from between. With a stiff, dry brush remove all chips, and with a small, soft camel's-hair pencil, wetting for each tooth, deftly draw it around the neck of each tooth.

With the curved end of the spatula apply the material to the palatal surface, packing thoroughly around the necks of the teeth, and a very thin coating over the surface, jarring, absorbing, drying, and trimming. Here taste can be exercised in making the lingual necks of the bicuspids and molars longer than the teeth represent, and also convexing the surfaces of the bicuspids to correspond with nature.

The first application of the material should be as complete as if it were the last, as the material shrinks, and the shrinkage should be complete at this baking.

The introduction of the Custer electric oven has simplified this work very much. The case is placed in the furnace without drying, and the heat turned on slowly. This should not be a full bake (glossy), but only a strong glaze.

The case should always be placed on the plaster cast after soldering and also after the first bake, to see if it has sprung; if so, press it back into place. There is no liability of springing in the last bake. When cool, wet the case thoroughly, and apply material very wet, jarring thoroughly to fill the crevices; then with denser material replace the shrinkage, form the rugæ, finish as at first, and bake this time to a gloss.

Upon cooling, apply the gum enamel, of a consistence to be applied with the spatula, about one thirty-second inch in thickness, and uniform; jar slightly and absorb; dry partially and trim with the wet brush around the necks of the teeth. The palatal surface needs a thinner coat than the labial. Bake to a gloss. The case can always be placed in a cold muffle to cool. Finish with files, fine sand-paper, small felt wheels with pumice and oil, and finally soft brush and whiting or rouge.

The next best furnace is the Revelation oil furnace, and then the old coke furnace, which always does good work.

A lower plate should be doubled around the margin one-eighth inch wide and no wiring, allowing the porcelain to come flush with the edge. The reason for this is the liability of needed relief at the margins sooner or later; the case would not *appear* marred, as it would if ground or filed through a wire.

Many have given up the use of continuous-gum work on account of the difficulty they had in repairing. If properly proceeded with, this is a simple matter. The case must first be imbedded in plaster and asbestos one-half inch deep, heated very slowly to a red heat. When cool, and the investment removed, there is no danger of cracking.

Grind out the remains of tooth to be replaced and a portion of the gum. Select a tooth or teeth (rubber teeth are suitable for repair). No soldering is needed.

If only one tooth, pack some material (lower fusing than the original) around it, and carefully place in the furnace; bring up the heat gradually to a good glaze. After cooling, apply the enamel. If several teeth are replaced, hold them in place with a light coat of plaster and asbestos over the ends or half-way down and extending onto the adjoining teeth.

If only the corner of a tooth is broken off, repair with the easy fusing material. If there are cracks in the enamel, grind into them and fill with body.—DR. L. P. HASKELL, *Cosmos*.

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### Festooning the Gums without Carving.

After the teeth are set up and waxed in the usual manner, a thin, tightly-wound string is first run through the hot wax, then laid around the necks of the teeth, following the curve of the gums at the gingival festoons; the string is smoothed and leveled down to the height of the wax plate, and the wax polished, with the string in position, using a soft brush and chalk. The case is now ready for investment.

After it has been vulcanized, the pink, rubber-festooned gums are polished with hard brush and pumice, then with soft brush and chalk, making a beautiful looking set, both in and out of the mouth.—DR. KESSELL, *Cosmos*.

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### Broken Instrument Removed from Root Canal.

DR. B. H. Catching, gives his method in *Dental Review*:

"The head of a Gates-Glidden drill was broken off in the root canal of a superior lateral incisor, about half way up. To remove it the canal was much enlarged to the broken piece. A four sided, sharp pointed drill was made from the broken instrument. A small hole was drilled by the side of the obstruction. Into the hole a Donaldson canal cleaner, repeatedly dipped in 75 per cent sulphuric acid was worked back and forth, with lateral pressure, which removed tooth substance from around the broken piece. A forcible discharge of water from a hypodermic syringe into the canal brought the piece out."

### Cataphoresis.

Dr. W. V. B. Ames, in *Dental Review* says :

"We are thoroughly satisfied that the carrying of the salts of vegetable alkaloids into the tissue contained within the dental tubuli and pulp canals by a certain application of the galvanic current is possible, to an extent, in all cases, and is a safe and commendable procedure. We are satisfied that the rational working out of the underlying principles of this electro-cocaine anaesthesia, and of the principles governing the introduction of various simpler compounds, and of the elements in their nascent state under the conditions furnishing greatest remedial power, will mark one of the most valuable, if not the most valuable epoch of dental practice up to this time.

The bleaching of teeth, the disinfection of roots and the treating of pyorrhœa by electrolytic decomposition have been accomplished facts for more than a decade to my knowledge, but electro-cocaine anaesthesia, although not new has been till some two years since so imperfectly understood, that as a profession we are just waking up to its value, and predictions are rife that the millennium in the way of painless dentistry is near at hand. The impetus given to the production of delicate and accurate apparatus for the governing and application of the galvanic current has been very marked, and now that every dentist who is in the vanguard must have such an apparatus at hand, the uses will multiply, and my prediction is that as the rationale is worked out, the electric current will aid us in accomplishing the major percentage of our successful medications.

The question of vital interest are: is electro-cocaine anaesthesia a thoroughly safe procedure; and in what percentage of cases is it successful?

The pulp anaesthesia is of itself unattended with risk of permanent injury, and danger of constitutional effects is not to be considered. I say, pulp anaesthesia of itself, because the introduction of cocaine into the stomach and general circulation by careless use would not argue against its proper use by so-called cataphoresis. By the time the alkloid has infiltrated the tissues to the extent necessary for the result, the operation is usually made aware by the absence of pain from the current, the process is discontinued, and there can be no undesirable results.

The result depends on one condition as far as I know, viz., the power of the patient to bear electric motive force exerted on the tissues. Given a favorable patient, and the result is directly proportional to the time of application, and inversely proportional to the resistance of tissue to be overcome. There are local conditions which may militate against suc-

cessful results, but these must be overcome. For instance, the leakage of current through adjacent gum tissue or through a metallic filling in an adjacent tooth is the most frequent obstacle to success. I have found also cases where the resistance was so increased, apparently, by deposition of lime salts, especially within the substance of the pulp, that very little could be accomplished in the anæsthetization and extirpation of that member. It is with such cases that one feels the need of a complete apparatus for detecting variations of the current. With a millimeter we are made aware of the resistance offered and have a clew to work upon; in fact we are forewarned that we need not expect results without the expenditure of relatively much time.

The one hundred and ten volt lighting circuit seems to be losing favor for electro-therapeutic work because of its unsteadiness, and also the liability of short circuiting through the patient some of the wires carrying heavy voltage. Such accidents have occurred and one such experience is sufficient for most operators.

I will not weary you with the details of any special applications, as those can be best brought out by the clinics, but I *will* call attention to what has been termed by some "secondry electrolysis," and by others "metallic electrolysis." Neither term is to me expressive of what is meant, but I have not a better one to offer. The term "metallic electrolysis" is probably more suggestive of the method of using a soluble metallic electrode for the positive pole, for the purpose of manufacturing salts of that metal in the nascent state just where needed, and having the metal carried into the tissues to some extent. A zinc electrode gives salts which are very coagulating; copper less so.

I have not had many favorable cases for the employment of this method, but I have seen some excellent results, and from theoretical and philosophical points of view promises much of value."

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### The Right and Left Side.

In the *OHIO DENTAL JOURNAL* for November is an article by F. S. Whitslar, D. D. S., of Youngstown, giving statistics which show that teeth decay on the left side of the mouth more than upon the right. In explanation of this the author says that it is because people eat upon the right side, keeping those teeth and gums clean, vigorous and healthy, to the neglect of those upon the left. While this is true, he might go farther back, ask why people eat mostly upon the right side, and obtain, if possible the primal and more scientific explanation.

This, we believe, is found in the fact that people are "right-handed."

The right hand and arm and the whole right side of the body receives more exercise and consequently is more vigorous and withstands disease more successfully. The muscles of mastication upon the right side are notably stronger, following the example of the better developed right hand and arm, and thus we see that the teeth, if equally perfect on both sides, are naturally used more upon that side for purposes of mastication, and so protected from decay.

Here is a plea for "ambidexterity." The man who desires well-rounded physical perfection should use either hand or leg equally well. Children should be so instructed, for in adult life ambidexterity is not easily acquired. Especially should the young man who expects to become a dentist cultivate this valuable adjunct to manipulative ability. Scarcely a day passes in active practice in which the writer does not regret the absence of his ability to work with the left hand, thus relieving the right in protracted operations, and also reaching some surfaces or points more directly and perfectly.—*Western Dental Journal.*

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### A New Uric Acid Solvent.

Lysidine is said to be three times stronger than piperazine in anti-uric power. Grawitz reports very favorable results from its use in two carefully studied cases, one of acute gout, and one of a more chronic form of the same disease. In acute articular rheumatism no positive effects were noted. From Grawitz's paper it would seem that this drug is worthy of more extended clinical study.—*American Therapist.*

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### Coating Casts for Vulcanite Work.

Procure a quarter of an ounce of "collodion," add to this three quarters of an ounce of sulphuric ether, so as to thin the collodion down, and pour into the bottle containing these a package of "silver gloss."

Silver gloss is a preparation of tin and zinc and may be obtained of all dealers in paints, oils, putty and other materials for house painting. Though called silver gloss it contains no silver. It comes put up in papers of an ounce or more; in the form of an impalpable powder. It unites, to a certain extent, with the collodion, when shaken, and is applied to the face of the plaster cast, as well as to the reverse of the investment in a case flasked for vulcanite work, with a camel hair pencil, leaving a very even and thin film over these which effectually prevents the adhesion of the vulcanite to the plaster, permitting the case to come from

the flask clean. The silver gloss may be had at slight expense, enough to last for a year or more with ordinary use. It should be kept in a well-corked bottle, and the pencil cleaned after each use. Should particles of it adhere to the plate, it can be entirely eaten off by immersing in a bath of nitric acid and water—one quarter acid, three quarters water; but this we have not found necessary as it comes from the flask clean.—*Dental Office and Lab.*

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### Interdental Space Guards.

In a contribution to the *Dental Cosmos* Dr. M. W. Hollingsworth advocates the use of guards in certain types of cavities. He takes, for illustration, approximal cavities in molars of the deciduous teeth. He says: "It will be observed that the adjoining approximal cavities separately present surfaces glenoid in character, offering little more than enamel for lateral walls in which to prepare the necessary retaining grooves or pits. Sensitiveness, close proximity of the pulp, or temperamental characteristics of the child may render it inadvisable to prepare means for the retention of the fillings in portions of the teeth having more substance. Under these conditions the adhesive quality of a good cement is at present our main dependence, unstable and briefly serviceable though it may be.

The guard is a metallic span or bridge with concave and convex surfaces, elliptical in outline, and having in its center a perforation.

In the prepared state the metal spans have upon their under or convex surfaces a coating of gutta-percha, a portion of which is presented through the central perforations. The spans may be of various sizes, adaptable to the different conditions presented.

An instrument by the aid of which the prepared spans may be properly and conveniently placed and pressed into position is so formed as to approximately fit the concave metallic surface of the span, and also engage the gutta-percha presented through the central perforation by means of the point which provisions reduce to a minimum the surface subjected to the adhesion of the gutta-percha. The point also acts as a pivot upon which the span may be rotated to any angle desired, becoming readily disengaged when it has served its purpose.

In the manipulation of the span, the instrument is slightly warmed and the pivoted point inserted into the perforation and turned to a convenient angle; then sufficient heat is applied to soften the gutta-percha, when it is quickly pressed to place.

The cervical borders of the adjoining cavities will thus be effectually sealed, and the interdental space bridged over and guarded against

annoying encroachments upon the gum, either by food or by the additional gutta-percha required in contouring and completing the filling.

That the adoption of this method of preserving the deciduous teeth and protecting the interdental spaces would often relieve the dentist of much of the woriment incident to prolonged and repeated efforts which his little patrons and adverse conditions entail upon him, has been fully proven by the experience of the writer."

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### The Behavior of Amalgams.

Judging from Dr. Black's published articles relative to the behavior of amalgams, it would seem that he has not appreciated the well established natural law which underlies and controls these phenomena. Only recently he claimed that oxidation of the metallic compounds was answerable for the observed variations; but while he has discarded the theory as unsatisfactory he still makes no mention of the law of the "persistence, conservatism and correlation of energy," which law should have been seized upon at first as explanatory of the phenomena of aging. The superficial oxidation of the reduced granules surely could not have the remotest influence over the molecular tendency of the mass to assume a condition antithetical to that forced upon it by an excess of the specialized energy.

I referred to this matter in a short paper read before the New Jersey State Society three or four years ago, and although not able to demonstrate the theory, to my mind there could be no other explanation.

In the violence of reducing the ingots to fillings or shavings, as the case may be, mechanical energy is expended, which energy is largely conserved and made manifest in the subsequent behavior of the amalgam. The heat generated is for the most part dissipated, but the molecules have assumed a polarized condition—a static energy capable of release whenever the conditions are favorable.

These conditions are quickly obtained when amalgam takes place. It is herein that this stored—magnetic—energy is further differentiated into normal energy of crystallization. When the alloy is freshly cut the static energy is at its maximum of possibility and "setting" of the filling is rapidly accomplished. Aging is a gradual diminution of this force and time becomes an element in the change. This is virtually a process of annealing. In ordinary temperatures it may require months—less time under somewhat higher degrees. The minor behavior of fillings after insertion, whatsoever they be, are still under domination of the law which must be duly appreciated in all its bearings for a full accounting of the phenomena.—W. S. ELLIOTT, *Dental Digest*.

**Nitrate of Silver in Root-canals.**

Dr. Charles D. Cheney, Hoboken, N. J., gives his experience with silver nitrate, as follows, in the *International*:

The publication in your November issue of a paper upon a nitrate of silver method of root-canal treatment decides me to give my own experience in the same direction.

I have not before this publication seen or heard of silver nitrate suggested for root-canal treatment. I have used it with satisfaction in ordinary cavities for a number of years, and during the period of *canal* use my satisfaction has been infinitely increased.

I may say I consider pulp-extirpation and canal-filling more scientific than any method of so-called pulp-“capping,” especially since silver nitrate makes the former operation practically successful and certain.

I have never seen any objectionable effects from its use in nerve-canals, or I believe I may say *any* “effects.” The use of the nitrate when the pulp is but thinly protected by dentine is not to be tolerated, but I have not observed any irritation to the pericementum when the canal may have been large and the walls thin.

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**Sectional Bridge for Inclined Teeth.**

J. A. Hanning, gives his method in *Items*, as follows:

This bridge is designed for cases where the piers lie, either together or apart.

One of the conditions on which success and usefulness depends, is that crowns supporting the bridge should accurately fit the necks of natural teeth used as piers. If the sides of the natural teeth are not ground parallel, the pier crowns will be stretched in setting bridge, and will not fit at the gum margin. No amount of burnishing will secure proper adaptation. If the attempt is made to grind both to permit proper setting of bridge the pulps may be exposed and require removal, or both may become so sensitive that the patient will not submit to proper grinding. The device here presented will avoid all such complications.

The crowns should be made to fit the piers accurately, placed in position, and an impression taken with plaster of Paris. Place crowns carefully in position in impression and pour model. Remove impression, and pier crowns will appear on the model in their relative positions. Swage and fill in cups of bridge as in ordinary case. Make a dovetail of thin platinum.

This may be made with a small pair of flat pliers, or over a small, three-

sided file, holding two thicknesses of platinum together. Be careful that the pieces of metal are held in absolute contact, and the result will be a perfect double dovetail.

Set the dovetail on model parallel with axis of either pier (anterior one preferred). Grind in and set facings, being careful to have the buccal edge of dovetail touch the backings of facings. Invest each portion of the bridge separately before removing from model, leaving portion of dovetail exposed. This will hold all parts in position, and permit separation at the dovetail. Cut away the model from the bridge and slide apart the sections at dovetail. Complete investment, add solder. Be especially careful that the dovetail of each section is thoroughly covered by investment, for if the smaller particle of solder flows on the surface, the sections will not go together.

The section in which the pier crown and the dovetail diverge, must be set first. The other section having the dovetail and the pier crown parallel, will slip to place without difficulty, thus avoiding grinding of natural teeth or multilation of the bridge. It is best to apply gutta percha or chlorform to the dovetail when last section is set, making a tight joint.

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### An Idea About Regulating.

Mr. A., aged about 40, came to me to have a right superior canine straightened. It was so far inside that its labial surface was on a line with the palatal surface of the adjoining teeth, and the lower teeth shut outside of it. The tooth was very firmly set. Ordinary appliances moved it so slowly that two or three months would have been required in its locomotion. As the teeth could not be closed when this one was passing the line of the lower teeth, and would have kept the patient two or three months without getting his grinders together, I decided the operation was impracticable unless some new method could be devised to hasten matters. A few days before I had bored a socket and implanted a canine in a lady's jaw. Why not make a socket in the right location in this patient's jaw and move the obstinate canine into it? And this I did, going within, say, a line of the apex, removing the process and carefully guarding the pericementum of the tooth. The canine now moved easily and rapidly, and in about a week it was brought into its new location. Of course I aimed to move the apex as little as possible and exercised special care not to disturb its vascular connections. This method of tooth locomotion is, I am satisfied, very easy for both patient and dentist. Indeed, I am not certain but others may have resorted to it before now. I am quite sure that I will often practice it again in cases where teeth to be moved are firmly set.—W. H. ROBINSON, *Stom. Gazette*.

**Blood Pressure the Cause of Eruption of Teeth.**

The writer is of opinion that upon anatomical and physiological grounds alone we are justified in assuming that the blood pressure exerted in the vascular tissue which lies between a developing tooth and its bony surroundings is the active mechanical factor in the process known as the eruption of the teeth.

Clinical experience adds its quota of evidence which must not be neglected. We all know of the tendency of unopposed teeth to elongate, even some time subsequently to the completion of their roots, and when the periodental membrane has become extremely fibrous and the alveoli considerably narrowed. If we have any doubts in the case of healthy teeth, as to whether this elongation is due to the normal blood pressure exerted in the periodental membrane, they should surely be dispelled by the clinical phenomena that present themselves when the blood pressure is pathologically augmented—in other words, when inflammation of the periodental membrane supervenes.—T. E. CONSTANT, *Dental Record*.

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**Hemorrhage After Tooth Extraction.**

I should like briefly to make known a simple method of stopping continued bleeding after extraction of teeth, which has proved quite effectual in my hands in several cases, in some of which plugging, various styptics, the actual cautery, etc., had been tried without success. It consists in passing a double silk thread through both sides of the torn gum, either with an ordinary curved needle, or a handled needle, and then tying firmly over the alveolar border. In none of the cases in which this method has been employed has it failed to stop the bleeding immediately and permanently. The stitch may be removed at the end of forty-eight hours. The merely temporary success or complete failure of the usual methods, and the perfect success of that described, lead me to think it may prove generally serviceable in what is frequently a very troublesome, if not dangerous form of hemorrhage.—DR. JAMES MCNAUGHT, *Cosmos*.

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**Hard Rubber out of Sawdust.**

A German patent has recently been taken out on the production of an imitation of hard rubber out of sawdust, which consists in mixing sawdust with chromatized glue, forming the object out of this mass by pressure between wooden or metal forms, then placing it in heated oil, varnish or tar until all the moisture is driven out of the sawdust. The article is

then placed in a drying oven, where it is heated to between 400 and 600 degrees F., where it soon takes on the appearance and properties of hard rubber. Sawdust of resinous woods are particularly adapted for this imitation.

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### Immediate Insertion of Dentures.

There is another class of cases where this immediate insertion of teeth is most useful, viz: in those mouths where the incisors are long, rapidly loosening, and protruding. How often we have patients with a mouth of this character, who come to us for advice, and here again, I say, extract and take your impressions at once. In these cases it is better to select teeth that are narrower than the natural ones, and while planted quite half an inch up the sockets, can have their tips inclined much further in than the teeth just extracted, a slight space being left between each tooth. Here the improvement in appearance is very great. When the denture can be inserted the same day as the extraction, the results seem best of all, and experience shows that the gums are not so sore as when we wait till the day following, for then the process of healing by granulation has commenced.—E. P. COLLETT, *Brit. Journal*.

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### Difficulty of Correct Diagnosis in Pulpitis.

DR. C. N. JOHNSON, at Chicago Dental Society (*Dental Review*) cited the following interesting case:—

“ It is difficult sometimes to locate the pain in pulpitis. Patients frequently refer it to some remote point. A lady came to my office early in July saying that she was having trouble on the right side, pointing to the interproximate space between the second bicuspid and first molar. She said the pain was located there. I made a careful examination and could find no cavity. The pain was not severe and I told her it was probably only temporary. While I was absent from the city she had a recurrence of the pain and had the tooth examined by some other dentist, and he was under the impression that there was a cavity in the first molar. However, she did not have anything done, and came to my office one day after I returned. She came in the midst of excitement and began to take me to task for overlooking a cavity and allowing her to suffer this pain. She pointed out the tooth which she thought was giving the trouble. She pointed definitely to the second bicuspid. I examined it, and could find no cavity in either the first molar or second bicuspid.

" My method of diagnosing these cases is this: Instead of cold I use heat. I take a cone of heated gutta-percha which is tenacious, and better than a hot instrument. It will cling to the surface of the tooth. I applied this to the second bicuspid and she flinched. I said ' Is that the character of pain you have been suffering.' She replied, ' No.' I then went from one tooth to the other until I came back to the third molar which had a large oxyphosphate filling in it. When I applied the heat to it she flinched again, and exclaimed, ' There, that's the tooth. I told you all the time it was that one,' and she put her finger on the second bicuspid. I drilled through the oxyphosphate filling and struck a case of pulpitis. I destroyed the pulp and this was the end of the trouble. This is another instance illustrating the fact that we cannot take a patient's word as to what particular tooth is giving trouble. We must find it out ourselves. The rule I follow is to test one tooth after another. The patient will flinch when a living tooth is touched, but it will not be the same character of pain that they have been suffering. It is momentary and passes away. But the moment you strike the right tooth, they will say, ' That is the kind of pain I have been suffering.' "

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### The Evolution and Abuse of the Serration.

In an editorial on the above subject, in the *International Dental Journal*, Dr. Jas. Truman, among other things, says: " If gold foil could be maintained at the same standard as it leaves the hands of the manufacturers, and that indefinitely, there would be no need of serrations. This, however, is not the case with gold foil, for the reason, demonstrated by Dr. Black, that gold is peculiarly liable to be affected by gaseous deposits, which largely destroy its cohesive property. The impossibility of securing fresh gold foil by the great majority of dentists must ever make this form of cohesive gold a source of difficulty to many operators, and especially so to beginners. Annealing may help, but it does not entirely remove the objection, neither does the remedial process proposed by Black, and the fact remains that, to the man who works a comparatively small amount of gold foil, its use, with the present form of serrated instruments, has become a matter of serious concern, and this will continue just as long as manufacturers depend for their information, of what is needed, upon the opinion of those nearest the centre of professional excellence.

It is quite evident to some of those who are called to observe the struggles of beginners that the serrations of to-day are practically wrong, and while this may not be so serious with power mallets and gold, it

becomes an absolute bar to good work with hand pressure and with tin. This metal must be used, if used at all, with a proper understanding of its cohesive property. The serrations here must be of a positive character and sharply defined.

The theory of some that gold can be burnished into a cavity by a smooth point or a point simply roughened is true only in a modified sense. That a satisfactory filling can be placed in by this method there can be no question, but is it of universal application? The answer, it would seem to the writer, must be in the negative. With the daily deterioration of gold foil after it leaves the manufacturer, the necessity for deeper serrations is evident, and the further removed the individual is from the great centers of supply the more will these be required.

The argument used against serrations is, as before stated, that these pit the gold. This is not a serious objection and need not hold with the last layers, which can be condensed by broader instruments and shallower serrations."

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### Mistakes.

With reference to mistakes. I should say one of the mistakes a great many good men practicing dentistry make is to put crowns on teeth containing living pulps. I do not care what the circumstances are. The chances are in a few years most of them will prove failures. I have taken off numbers and numbers of crowns that were put over teeth with living pulps simply because decay had taken place between the teeth on the necks and exposed the pulp. When the crown was off it was the hardest work in the world to fit something over it. That is especially true of cap crowns at the end of the bridge where you cover the whole tooth.

With reference to the question of fees. Somebody spoke of consultations, etc. I think it is a good idea. The trouble is, our men are not up in the ethics of consultation. They do not take the right course in going at it. I have a great many men who want to get advice about cases without giving any previous notice. As a rule they will march the patient right into the office when I am in the midst of doing some tedious or delicate operation and do not want to stop five or ten minutes. May be it will take longer to find out what is the matter. After examining the case the dentist will walk out with the patient and say, "Doctor, I thank you." From the standpoint of consultation, the advice of a man who gives an opinion ought to be worth anywhere from ten to twenty dollars in a case like that. I do not give advice for nothing if I can help it. When people write me for advice in regard to certain cases and

do not send a fee, I throw their communications in the waste basket. After getting a few lessons of this kind they will stop. A man who wants to get advice should be willing to pay for it. If he cannot pay for it he should turn the patient over to somebody who can treat him properly.—A. W. HARLAN, *Review*.

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### Septic Intoxication from Alveolar Abscess.

When we are confronted with abscess upon temporary teeth, not infrequently we have marked examples of the swift reactions of the infantile system. I have noted many cases of septic intoxication in connection with abscess upon the temporary teeth, and in some instances marked septic poisoning, rigors, a fever with temperature 104°, some delirium, and disturbances of the alimentary tract. These cases should have early evacuation and thorough syringing with pyrozone, three per cent., followed by an injection of a ten per cent. solution of meditrina, and the symptoms usually vanish. After sterilization and the subsidence of the inflammatory symptoms, the roots of these teeth should be filled with balsamo del deserto if you can manipulate it; nearly all of my attempts to use it, following the directions given, have resulted in dismal failure, and recourse was had to salol or paraffine. Aristol is a good medicinal dressing for these cases.—H. H. BURCHARD, *International*.

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### Cocain Poisoning: Magnan's Symptom.

Rybakoff, at a meeting of the Neurological Society, of Moscow (*Neurol. Centralbl.*), insisted on the diagnostic value of the symptom of chronic cocaine poisoning described by Magnan. This is an hallucination of common sensation. The patient complains of feeling some foreign body under the skin. In some cases the foreign bodies felt were like grains of sand, in others slightly larger; generally they were described as more or less rounded, and gave rise to complaints of microbes, worms, crystals, etc., situated just under the skin. While other symptoms of chronic cocaine poisoning occur also in alcoholism and other poisons, Magnan's symptom seems to occur only with cocaine. It is therefore of real diagnostic value, especially in cases where the patient is unwilling to admit having used cocaine. Where cocaine is extensively used in surgery and dentistry, the appearance of Magnan's symptom is a valuable indication for the immediate cessation of the drug.—*St. L. Med. & Surg. Journal*.

### Pulp Devitalization in the Teeth of Children.

One of our great difficulties in dealing with the teeth of children is the devitalization of the pulps when indicated. I have used, and with much success, for this purpose a paste of powdered cantharides and carbolic acid; say about one-twentieth grain of the powder with enough carbolic acid or creosote to make a paste. I know that the use of arsenic for this purpose is justly viewed with much suspicion, but my opinion is that it is largely a question of how much arsenic is used. I use arsenic for this purpose in very minute quantities and have had no ill results. The canals of children's teeth should of course be cleansed thoroughly and sterilized. I question the use of cotton dressings in these cases, for should the foramen be large, owing to a partial resorption of roots, soft tissues might be impinged upon, and the cotton becomes a source of irritation or worse. I think the safer practice is to use fluid in the canals and oxychloride in the pulp chamber.—DR. DARBY, *International*.

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### Quick Repairing.

We will suppose a single tooth, or even a section, becomes loose or is broken. First file the rubber away for the reception of the new material. Then drill a hole under the adjoining teeth, slanting. If a section, drill three holes, also from the inside of the plate, counter-sink and cut pins quite near the heads, indeed long enough to come through the plate and to be bent at right angles. Place them in position and pour plaster to keep them in place. When the plaster has set put your teeth where you want them. If a section, you will have the two side pins with heads inclined and three with crooked ends. If a single tooth you will have four heads quite close together. While holding the plate in the left hand place enough of Wood's fusible metal to fill the gap and with an amalgam plugger, either held in a small alcohol blaze or in hot water, you can secure the teeth equally as well as with vulcanite, and in half an hour at most.—G. V. RELYE, *Dominion Journal*.

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### To Polish Scratches from Mouth Mirrors.

Dr. M. J. E. Moore, of Allegheny, uses a medium sized felt wheel on the lathe, and wet pumice. Use considerable pressure and plenty of pumice, being careful, however, not to generate heat by the too long application without fresh application of pumice. You will be astonished at the result. All scratches and marks made by corundum stones, etc., on the mirrors, may thus be entirely obliterated.

## EDITOR'S NOTES.

**Union of the American and Southern Dental Associations.**

WE desire to call the attention of our readers to Dr. Fillebrown's article, on page 184, as it is a subject that interests every society member. The union of these two societies has been discussed more or less during the past few days, but no definite decision has been reached. At the coming meeting at Old Point Comfort, in August, the matter will be settled. The question which interests us most at the present time is not so much the advisability of union, that is very generally conceded to be the best plan, but as to what kind of an organization the new society shall be. Shall it retain the name "American," or be called "The National," or something else? Shall the plan of sections be continued? What other arrangements can be made that will better serve the interests of the society? Will the formation of division associations, as mentioned in the paper, tend to aid the National Association, or will it have a tendency to keep the eastern men in the east, the western men in the west, etc., and thus interfere with the attendance and interests of the main body? These are but a few of the many questions that come to mind in connection with this subject, and which should be duly considered and brought out at the coming meeting. We hope every reader will peruse this paper and think about the subject, so that we may, at the proper time, have the results of deliberate thought and investigation.

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**New Publications.**

A PRACTICAL TREATISE ON CROWN- AND BRIDGE-WORK. By George Evans, Lecturer on Crown- and Bridge-work in the Baltimore College of Dental Surgery, member of the American Dental Association, etc., etc. Fifth edition revised. Philadelphia: The S. S. White Dental Mfg. Co., Pub., 1896. Price, net, \$3.00.

This has been and is the leading work on crown- and bridge-work. It is not a book with but one idea, the author's, but it comprises all of the best practical methods that have been given to the dental profession. And these different methods have been

presented with impartiality, each being fully detailed and illustrated. In revising this work the author says that every effort has been made to bring it abreast of the advances made. In order that the presentation may be comprehensive without being bulky, obsolete matters have been omitted, descriptions of unimportant variations have been curtailed, repetitions avoided as far as possible, and an endeavor made to treat the various phases of crown and bridge-work concisely, but never sacrificing clearness for brevity.

It is profusely illustrated, there being more than 600 engravings, which adds greatly to a clear understanding of the methods described. The book comprises 330 pages of text and includes everything in this line of work that the dentist has occasion to use. No dentist who desires to be progressive can afford to be without this work and if any of our readers have not secured a copy they should do so. It is worth many times the cost.

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COMPEND OF DENTAL PATHOLOGY AND THERAPEUTICS. By Henry H. Burchard, M.D., D.D.S., Special Lecturer on Dental Pathology and Therapeutics, Philadelphia Dental College. Philadelphia: The S. S. White Dental Mfg. Co., Publishers. Price, net, \$1.75.

There have appeared many books of Questions and Answers, of the so-called quiz compend type, the majority of which have fallen far short of the object intended by the author. The book before us, while it is a compend it has not been prepared as an aid to students in memorizing answers for examination, but is essentially a student's note book, to which additions and details are to be made in conformity with didactic teachings. For this purpose it is interleaved. "In framing the questions," says the author, "an endeavor has been made to have each of them represent a guiding principle in dental pathology or therapeutics." The author seems to have carried out his designs and the result is that the work is the best of the kind that has yet appeared. The answers to the questions are definite, concise, and according to the latest and best teaching in these branches. It is a book that will be an aid to the student and one that the general practitioner can use to advantage in *brushing up* on the subject presented.

THE YEAR BOOK OF TREATMENT for 1897. A critical review for practitioners of medicine and surgery. Philadelphia: Lea Brothers & Co., Publishers, 1897.

This work of 480 pages is a summary of the best methods presented during the year past in the various medical societies, journals, etc., by the best authorities in medicine and surgery. The book is divided into sections, each section being devoted to diseases of some one department of medicine. Men of note have been engaged to abstract and arrange material for each department so that whatever goes into the publication is worthy of notice. The medical practitioner who desires to keep abreast of the times should have such aids, and this is one of the best and handiest volumes with which we are acquainted.

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### Obituary.

DR. J. A. ROBINSON,

DR. JEREMIAH A. ROBINSON, or, as he was familiarly known to the members of the dental profession "Uncle Jerry Robinson," died at the home of his son, Dr. A. Robinson, Grand Rapids, Mich., Wednesday, March 3d, 1897, aged 85.

Dr. Robinson was born in Concord, Mass., May 31, 1812. He was a direct descendant of Dr. John Robinson, of Leyden, who was expecting to sail for America in the Mayflower with the pilgrims, but on account of sickness, which proved fatal, he was left behind and died.

On his mother's side, whose name was Cogswell, his ancestors landed in Ipswich, Mass. in 1635, having been wrecked on the coast of Maine in the ship *Angel Gabriel* and from thence made their way by land to the former place, where, after remaining a short time the family moved to Concord Mass. His grandfather was a lieutenant-colonel in the revolutionary war, and was a distinguished soldier.

Mr. Robinson received his early education at the Concord Academy at the same time with Ralph Waldo Emerson, and Thoreau, and was a cousin of Emerson's.

He was early apprenticed to a watch maker, when after serving six years he bought the remainder of his time and started in 1831 for Lowell, Mass., where he worked as a journeyman for a short time. It was while in Concord during his last year of apprenticeship that his attention was first called to dentistry by a travelling dentist, who learned that he was somewhat skilled in the manufacture of small steel instruments and applied to him for help in shaping and tempering some excavators and scalers.

During the first year of his sojourn in Lowell he became acquainted with a physician named Mansfield who had turned his attention to dentistry and was also making porcelain teeth by carving them. In a short time Robinson commenced the study of dentistry with Dr. Mansfield and after a year with him, went to Boston with Dr. Harwood for the purpose of learning to fill teeth. In 1837 he practiced in Concord and Waltham, and in 1838 established himself in Salem, Mass., where he remained until he turned his face westward in 1853.

He remained in Cleveland five years and was a member of the firm of Robinson, Ambler & Robinson, which was afterwards changed to Robinson Brothers, Dr. Ambler forming a business connection with Dr. B. T. Spelman, then of Ravenna, O.

Together with Drs. Strickland, Atkinson, Slosson, Horton and others, he issued a call for a meeting of dentists in Northern Ohio for a dental convention which held yearly meetings a short time and then died. In a short time the dentists who had enjoyed the benefits of communion with each other, built on the remains of the convention a society called the Northern Ohio Dental Association, which still flourishes and has a membership so large that Dr. Robinson used to say that if he never did anything more for dentistry than what his efforts had accomplished in bringing forth this society, he should die and think his life had not been spent in vain.

During the prime of life he was in advance of the profession in many things and abreast in all. Since he passed his eightieth birthday the writer has seen fillings, bridge-work and treatment that would do credit to any man.

When living in Jackson, Mich., where he passed the last of his professional life he was very active in society work and had been twice president of the Mich. State Society, and was very

active in securing legislative enactments for the establishment of the dental department of the University of Michigan.

Of four sons born to him three embraced the calling of their father, two of whom are still in practice, Dr. J. E. Robinson of Cleveland and Dr. A. Robinson of Grand Rapids. Dr. Martha Robinson Ewald, now practicing dentistry in Brooklyn, N. Y., is a grand-daughter of his. Although much interested in state and municipal affairs he held but few offices, having as we said but little time to spare from his life's work, dentistry.

Dr. Robinson celebrated his golden wedding on March 3d, 1882 and lived ten years afterwards before being called upon to part with his wife, who died in Jackson in June, 1894.

The writer is not sure from which college Dr. Robinson received the degree of D.D.S., but think it was the Baltimore College.

Dr. Robinson was an ardent prohibitionist. He joined the abolition movement when Phillips and Garrison started their crusade against slavery and never voted for a president of the United States, who was elected, until Abraham Lincoln in 1860.

Dr. Robinson had been in actual practice of dentistry for more than sixty years.

J. E. R.

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#### Resolutions on the Death of Dr. S. B. Brown.

In behalf of the Northern Indiana Dental Association, of which Dr. S. B. Brown of Ft. Wayne, was a member, we beg to submit the following resolutions:

WHEREAS, The great and Supreme Ruler of the universe has in His infinite wisdom removed from among us one of our worthy and esteemed fellow laborers, Dr. S. B. Brown, President, and whereas, the long and intimate relation held with him in the faithful discharge of his duties in this society, and in the profession at large, makes it eminently befitting that we record our appreciation of his deeds and good fellowship among us.

*Resolved*, That the wisdom and ability which he has exercised in the aid of our organization by service, contributions, and counsel, will be held in grateful remembrance;

*Resolved*, That the sudden removal of such a life from our midst leaves a vacancy and a shadow that will be deeply realized by all the members and friends of this organization, and will prove a serious loss to the community and the public;

*Resolved*, That with deep sympathy with the bereaved wife and relatives of the deceased we express our hope that even so great a loss to us all may be overruled for good by Him who doeth all things well;

*Resolved*, That a copy of these resolutions be spread upon the records of this organization, a copy printed in the local paper and a copy forwarded to the bereaved wife and family relatives.

J. F. WERNER, JR., *Sec'y*, Elkhart, Indiana.

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## SOCIETIES.

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### Iowa State Dental Society.

THE Iowa State Dental Society will meet in Des Moines, May 4-7, 1897.

W. G. CLARK, *Sec'y*.

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### Michigan State Board of Dental Examiners.

THE Michigan State Board of Dental Examiners will meet at Grand Rapids, May 10th, 1897.

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### Illinois State Dental Society.

THE thirty-third annual meeting of the Illinois State Dental Society will be held at Peoria, May 11 to 14, inclusive, 1897. An excellent program is in the course of preparation. Members are urgently requested to be present. The profession, generally, is cordially invited. A reduced rate of one fare and a third has been granted from all points within the State.

LOUIS OTTOFY, *Secretary*.  
Masonic Temple, Chicago.

**Southwestern Michigan Dental Society.**

A MEETING of this society will be held at Kalamazoo, Mich., April 13th and 14th, 1897. Dentists are cordially invited to attend and take part in the meetings.

F. H. ESSIG, Secretary.

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**Questions Submitted for Discussion by Local Societies.**

FORMULATED BY THE COMMITTEE APPOINTED BY THE AMERICAN DENTAL ASSOCIATION.

1. Pyorrhea Alveolaris; what is it and how many varieties are there? Are all local in origin or constitutional, or both? What is the treatment, local or constitutional, or both? What may be regarded as a cure? Is the disease likely to recur?

2. *a*—What is the cause of dental caries? *b*—Why is caries so much more active in some mouths than in others? *c*—What changes take place where caries ceases its activity in mouths heretofore predisposed? *d*—Are there recognizable signs by which we may know whether or not caries will cease with advancing age?

3. To what extent are we justified in giving our patients systemic treatment?

4. To what extent and when, are we justified in using cataphoresis? Is there danger of injuring the dental pulp or other tissues by its use?

5. What can we do to increase the attendance at our dental societies?

6. In view of the recent investigations has amalgam been a blessing or a curse to humanity?

7. Are there any proofs that mercury in amalgam fillings is injurious to the health of the patient?

8. What are the best materials for filling teeth and the prospective durability of fillings in different cases?

9. What are the best methods of bleaching teeth?

J. N. CROUSE,  
L. P. BETHEL,  
A. W. HARLAN,

} Committee.

**From the Section of Dentistry of the XII International Medical Congress in Moscow.**

THE Organizing Committee of the Section of Dentistry of the XII International Congress to be held in Moscow, Aug. 19-26, 1897, here present the program of this Section. Surgeons and dental surgeons are urgently requested to contribute to the success of the above mentioned Section by participating personally at its occupations and by a report upon one of the questions in the said program.

In accordance with Section 17 of the Regulation of the Congress, papers dealing with the subjects, named in the program will have preference over others. This does not, of course, exclude communications upon other subjects, but such communications can only be read provided that time permits.

It is very important to receive the paper or, at any rate, a short account of it before May 1, 1897, for printing and distribution amongst the members of the Congress.

DR. F. REIN, Manager of the Section.

DR. I. KOWARSKY,

DR. N. NESMEJANOV,

DR. S. URENIUS,

Members of the Committee.

Address of the Manager: DR. F. REIN, Moscow, Little Dmitrowska, h. Scheschkow.

THE PROGRAM OF THE SECTION OF DENTISTRY OF XII INTERNATIONAL MEDICAL CONGRESS IN MOSCOW.

1. What kind of general and special learning is desirable for persons who are to occupy themselves with Dentistry? *The Lecturer: Professor Dr. Julius Scheff, Vienna.*
2. The Hygiene of the cavity of the mouth and of the teeth.
3. General and local anesthetics for tooth extraction. *The Lecturer: Dr. V. Richardson, London.*
4. Cataphoresis in Dentistry.
5. The essence and treatment of the Pyorrhea Alveolaris. *The Lecturer: Professor Dr. Jozsef Arkovy, Budapest.*

6. The treatment and filling of pulpless teeth.
7. Crown- and Bridge work from a hygienic and technical point.  
*The Lecturer: M. Morgenstern, Baden-Baden.*

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### Errata.

IN the article by W. A. Price on "Relative Efficiency of Current Controllers for Cataphoresis," published in the Feb. No. of the OHIO DENTAL JOURNAL, the following correction should be made. Page 50 and eleven lines from the top should read "25,000 ohms" instead of 15,000 ohms.

On page 111, Feb'y issue, at bottom of page, should read v gr. of cocaine instead of ij gr. as printed.

On page 125, March issue, ninth line, first word, should read "denture" instead of "dentine."

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### OUR AFTERMATH.

A WEEK OF ORTHODONTIA.—Dr. C. S. Case, Chicago, gave a six days' course of instruction in orthodontia, in the Dental Department of Western Reserve University, Cleveland, the first week in March. Instruction was for both students and practitioners. The following practitioners attended the course, which was meritorious, instructive and interesting from beginning to end: J. R. Callahan, O. N. Heise, and M. H. Fletcher, Cincinnati; W. W. Dugan, Clyde; L. P. Bethel, Kent; Sherman, Willoughby; C. R. Butler, Henry Barnes, W. T. Jackman, W. A. Price, H. F. Harvey, H. L. Ambler, W. H. Whitslar, G. H. Wilson, J. F. Stephan, M. G. Furlong, Ira Brown, Wasser, and Hurd, of Cleveland.

DIED.—DR. H. W. RAY died suddenly in his office at St. Joseph, Mich., March 17th. He had finished some work for a patient at 12:15, appearing at the time in the best of health: at 12:30, when a son arrived to take his father to dinner, he found him lying dead on the office floor. Neuralgia of the heart was the supposed cause of death.

Dr. Ray was born in 1848, attended Albion College, and later entered the Philadelphia Dental College. He practiced dentistry three years in Bellevue, Ia., then, in 1875, began the practice of his profession in St. Joseph, where he has since been prominently identified with the professional men of the county. In society circles he also occupied a position of influence.

He was a member of several dental societies and a progressive dentist. He leaves a wife, two sons and a daughter to mourn his loss.

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## CONTRIBUTIONS.

### Dentistry in Japan.

BY SEIMARO KUBOTA, JAPANESE DENTIST, TOKIO, JAPAN.

DENTISTRY in Japan is yet in its infancy as you will understand when I tell you that about fifteen years ago Japan held no regular dentist—but there were two or three students of medicine who practiced dentistry as sort of an accommodation to their patients. In 1884 the Imperial Japanese government established an Examining Board for Dental Practice, which meets twice a year, in April and October, and before which each candidate must present and pass the examination in the following studies: Chemistry, anatomy, physiology, pathology, operative dentistry, materia medica and therapeutics, and clinics. Each candidate must present his certificate indicating a study of at least five years preparatory to the work. One examining board meets at Tokio and another at Kioto. The first dental college in Japan was established in 1887 by Yutaka Kubota, my honored father. It is still in progress and is called Tokio Shika Senmon Igasko—meaning Tokio Dental School.

Since 1887 two other dental schools have been established in Japan, one in 1890, by Dr. Takayama at Tokio, and one in 1894 by Dr. Kojima at Nagoya city. Tokio has two dental associa-

tions. One composed of all the dentists and students, making an active membership of more than three hundred. The other composed of dental practitioners and having a membership of about thirty. The larger association is called the Tokio Dental Association and meets every two weeks for mutual improvement. It publishes a journal monthly, describing the meetings and progress of dentistry. Dr. Yenomoto is the president. With the population of forty millions the empire of Japan contains only about three hundred dentists, thirty of whom are located at Tokio, the capital, with a population of about two millions.

There are in the empire of Japan only six Japanese dentists who have received their diplomas in America and one American dentist, Dr. Smith of Yokohama.

The six Japanese dentists who hold American diplomas are as follows:

Dr. Suganuma, Pennsylvania Dental College.

Dr. Katayama, Ohio Dental College.

Dr. Isawa, Harvard University, Dental Department.

Dr. Masuda, " " " "

Dr. Nakamura, Philadelphia Dental College.

Dr. Ichinoi, " " " "

At present, owing to our foreign treaties, all foreign dentists are limited in place of business to open ports, hence foreign dentists can practice only in Yokohama, Kobe, Nagasaki, Niigata, Hakodate. This restrictive treaty will expire probably within the next two years and then all Japanese cities will be open to foreign dentists.

I have been asked if the American dentist was superior to the Japanese and I answered in this way: "We Japanese are eager for knowledge and want the best that can be had, hence the fact that we come to America for our dental education, proves that we think the American dentist the best in the world."

There has existed in Japan for several hundred years a primitive system of dentistry—a system whereby artificial plates were made of ivory or wood and finished in a few hours—as our people advance in education they prefer the modern dentistry and the old primitive dentists are fast losing their patients. I have been asked if it is true that Japanese dentists extract teeth with their fingers? Yes, it is true, but the teeth extracted are all deciduous teeth after the root has become absorbed. Since

the introduction of the American forceps the extraction of teeth has been much easier for the dentist and less painful to the patient.

We have much to thank the American dentist for and as we are endeavoring to carry your knowledge to our own dear country we hope the time will not be far distant when the Japanese dentist will have so far advanced in his profession that he may stand side by side with his American teachers.

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### **Pyrozone and Peroxid of Hydrogen.**

BY W. H. JACKSON, D.D.S., ANN ARBOR, MICH.

AFTER using these substances, immediately before the permanent stopping of pulp canals, I was at a loss to account for the frequent disturbances that followed, and found upon investigation, that, although thorough precautions to dry the canals had been made, there would still be gas formed hours after their use had been discontinued. This is not written to condemn the use of these agents, for they are very valuable and I would not like to be without either of them, but would not advise the use of either agent within a short time of final stopping of the pulp canal, for fear of disturbance following, except when there is a free opening through the gums.

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### **The Apical Amputation of Roots.**

BY E. B. LODGE, D.D.S., CLEVELAND, O.

THE dentist is a blessing to mankind in just such measure as he is able to help his fellow beings, whether it be in the replacement of lost teeth by artificial dentures, the relieving of suffering caused by dental diseases, or the restoration to health and usefulness of the natural dental organs, after they have become jeopardized by the ravages of disease.

Within the past few decades, our profession has made remarkable advancement in all departments of dental science and art. There have been splendid achievements in dental therapeu-

tics and unparalleled improvements in dental instruments. These advantages, supplemented with the dental knowledge afforded us by such men as Miller, Black and Garretson, make it possible to-day to save teeth by thousands that could not otherwise be reclaimed.

Believing that the operation of amputating the apex of the root is a procedure of the utmost value in a certain well selected class of cases, the writer has chosen to deal with this subject. As is well known, this is not a new operation, but one that has been practiced for many years. It is, nevertheless, well to revive old subjects occasionally and to examine them from different phases, and in the light of advanced lines of thought.

There are several distinct conditions where we would think this operation the best, if not the only satisfactory treatment.

Firstly, in chronic alveolar abscess, where, owing to sanguinary calculus at the apex of the root, the ordinary treatment is ineffective.

Secondly, in cases where the root canal has been filled, entombing septic matter at the apex in sufficient quantity to cause a condition of chronic irritation at the apical space, or in cases where irritation comes from a mechanical irritant, as for example, a broken nerve-broach protruding through the apical foramen.

Thirdly, in event of exostosis at the end of the root, and

Fourthly, in cases where the presence of pulp nodules will not permit the action of arsenious acid.

Having decided that the operation is indicated in a certain case, and having produced local anesthesia by some method reliable in the operator's hands, remove the overlying gum tissue sufficiently to expose the process at the point where it is to be operated on. There are three methods for doing this:

Firstly, by the use of an escharotic, as 95% carbolic acid, applying it at the proper point and carefully scraping away the coagulated tissue, then reapplying the agent and again scraping until the process is exposed; or,

Secondly, by using a tubular lancet in the engine, cutting a circular incision, the tissue lying within being then dissected away, bringing the alveolar process to view; or,

Thirdly, by the use of the three line or Y incision, the flaps being turned back. This method the writer ordinarily prefers.

Now, having the process exposed over the apex of the root,

select a Younger trephine of suitable size for the case in hand, and with the engine pass it carefully through the external plate of bone and then on through the apex of the root. The included tissue will perhaps come away with the instrument, but if it does not, it can easily be removed with some form of excavator. If it is desired, from the nature of the diseased condition, to remove more than simply the apical portion, then instead of placing the trephine over the apex of the root, place it nearer the crown of the tooth and pass it through the root. After thus removing a section of the root, the apex may be dislodged by the use of a suitable instrument.

All that is now left to be done is to take a fissure bur of the proper size and remove any remaining spiculae of root or bone and also any necrosed tissue that may not have been included within the trephine. Then syringe out the cavity with tepid water, containing some good antiseptic as phenol-sodique. This will remove any remaining fragments of tooth or bone, and render the cavity aseptic.

If the root has not been filled, now is the time for that operation. The filling material may be forced through the root and the excess removed, and the end of the root left smooth. The wound should now be filled with a tent of cotton saturated in phenol-sodique or other antiseptic and the operation is completed. The dressing should be renewed the following day and for a few succeeding days, until it has become sufficiently filled with granulations to make it no longer needful.

The wound usually heals kindly and in a short time, leaving the tooth in good condition.

The operation is not difficult to perform and the writer has employed it successfully, even upon the molar teeth. Strict asepsis should, of course, at all times be observed. The writer regards apical amputation as an excellent measure to resort to where other means of saving the tooth offer little hope, and he is confident that no one is better prepared to do this than the well-equipped dental surgeon.

## Bacteria of the Mouth and Teeth.\*

BY C. T. WHINERY, D.D.S., TOLEDO, OHIO.

SCIENTIFIC investigations during the past few years prove to us that the human teeth as a gathering place and incubator of diverse pathogenic germs, has an important part to play in producing not only local disturbances, but also general disorders throughout the body.

It was the celebrated Dutch chemist, Leeuwenhoek, who was the first to observe microscopically, that small organisms exist in the human mouth in great numbers, and in a treatise bearing the date 1683, he gives descriptions and diagrams of several kinds of bacteria from the mouth. From that time down to the present there has been a corps of patient and industrious investigators elucidating the incontestable truths of science, and what Koch has achieved for general medicine, Miller has duplicated in his specialty. The labors of Black, Bodecker, Miller and other microscopists are rapidly pushing dentistry forward in the direction of an exact science.

The association of bacteria with disease followed soon upon their discovery, and many disease germs have been isolated, studied and classified. It has been demonstrated by practical experiment that bacteria are responsible for at least a majority of the diseases incident to animal life. They are found in the mouth in untold numbers and in great variety of species, here we find every requisite for the flourishing of a colony of bacteria: for example, there is the proper temperature, sufficient moisture, a constant supply of oxygen for those that require it, and food in abundance, —the food being furnished by the saliva and such particles of the ingestum as may have remained after a meal. Thus we see that the conditions as we find them in the mouth are such as predispose a rapid and vigorous growth of most forms of germs. From this fact it follows that if infectious varieties find abode in the mouth, they are liable to assert their action if an opportunity is offered, and so cause the mouth to become a center of infection. As the air is laden with all sorts of living particles, we are con-

\* Paper read at Ohio State Dental Society, Columbus, Dec., 1896.

stantly breathing in germs and spores and those commingle in the mouth with others taken with food and drink.

The diseases believed to be induced by the presence of bacteria in the mouth are dental caries, pyorrhea alveolaris, alveolar abscess, septicemia, necrosis, suppurative processes of the margins of the gums, forms of stomatitis, diphtheria, pulpitis, disturbances of the alimentary track, affections of the lungs, syphilis, etc. The etiology of pyorrhea alveolaris is still shrouded in mystery. Some think it is caused by some constitutional disease, while others contend that it is caused by some local disturbance or irritation, and a few are inclined to believe that the disease is of parasitic origin. The last theory is very much strengthened by the fact that in the majority of cases bacteria are present in large quantities. To them Miller attributes the pus incident to this disease. In these cases the predisposing cause should be treated, whether of constitutional or local origin. All deposits should be removed from around the roots of the teeth and the pockets washed out with antiseptics. Many cases are on record where septicemia, causing the death of the patient in a few hours, has resulted from the accumulation of pus about a diseased tooth, or from operations in the mouth.

Alveolar abscess is an infectious disease, usually manifesting itself locally, but frequently is accompanied by symptoms of a more alarming nature, especially when many cases terminate fatally through the supervention of septicemia. It cannot be doubted that wherever large numbers of micro-organisms are allowed to accumulate in any portion of the body, general infection is very liable to occur, and secondary abscesses may start up as a result of these micro-organisms being carried to other parts of the body through the medium of the blood or lymph channels, and there multiply wherever a point of diminished resistance is offered.

We readily see how the mouth, since it is a source for the constant recruiting of bacteria, furnishes bacteria to the stomach and intestines. Of course in a state of good health the stomach is able to guard against these intruders through its acid condition and mechanical manipulations, but when the vitality is lowered, as it is at times during febrile diseases for instance, it is not to be marvelled at that the number of germs swallowed do have some deleterious effect. We have known patients under

treatment for similar troubles and also for indigestion, to most scrupulously sterilize all articles of diet, and then pass them through a mouth seldom visited by a tooth-brush, thereby incorporating with them millions of bacteria. In these cases it seems to me too much care cannot be taken in order to bring about an antiseptic condition of the mouth.

It has been demonstrated beyond a doubt that the Klebs-Löffler bacillus is the chief cause of diphtheria. Just how the bacillus obtains footing in the mouth and throat is not clear, whether the bacillus is lodged in the throat from the air taken in by inspiration and remains there until some lesion is presented, or until the vitality of the body is lowered sufficiently for it to assert itself, is still a mystery. But the fact that a slight wound in the mouth, or the presence of diseased teeth may provoke an attack of diphtheria, seems to indicate that the germ may be present in the mouth quite frequently. One of the most important bacteria found in the mouth is the pneumo-bacillus of Friedlander, also known as Friedlander's pneumococcus. This germ may appear as an oval coccus, but it really is a short thick rod. This germ, while not the cause of pneumonia, its frequent presence in that disease may serve to bring about a "mixed infection." It is pathogenic for mice and young rats; guinea pigs and dogs are less susceptible, while rabbits are immune. It has been stated that this germ is present in a virulent form in perhaps one out of every four or five healthy mouths, and is also present in all mouths in a non-virulent form, and the special conditions of the mouth may favor a change from the non-virulent to the virulent state.

The micrococcus of croupous pneumonia, also known as Frankel's diplococcus, and the microbe of sputum septicemia, is occasionally found in the saliva of healthy persons. The same organism or scarcely distinguishable varieties are present in cerebro-spinal-meningitis and peritonitis. Cultures from different sources show a marked difference in virulence and when grown on artificial media rapidly attenuates and dies out, unless passed through a susceptible animal every few weeks. Subcutaneous injection of o. 1 to o. 2 c. c. of a bouillon culture in rabbits produces death in 24 to 48 hours. The diplococcus is found in the blood and internal organs and is surrounded by a capsule. This germ is the recognized cause of croupous pneumonia.

Miller says: "Within the last few years he has isolated more than one hundred different kinds of bacteria from the juices and deposits of the mouth. A number of these were identical with well-known and widely distributed species; for example, hay bacillus, potato bacillus, lactic acid bacillus, bacillus of green pus, micrococcus tetragenus, mycoderma aceti, streptococcus pyogenes aureus and albus," etc. While others appeared to be new kinds, although he was not able, on account of the great number, to attempt in every case to establish the identity or non identity with known species.

There are, however, a number of bacteria, which almost invariably occur in every mouth, and which may be termed mouth bacteria proper. These are *leptothrix innoxinata*, *bacillus buccalis maximus*, *leptothrix buccalis maxima*, *jodococcus viginatus*, *spirillum suptigenum* and *spirochaete dentium*. As to the part bacteria play in producing dental caries, many investigators have contributed to the "bug" theory, as it is somewhat facetiously termed, although almost universally adopted, still there are a few so conservative as to hesitate to accept it. To Miller belongs the credit of defining its limits and demonstrating its truthfulness. His theory is this:—Bacteria of a peculiar kind,—the *leptothrix bacilli*,—in some accidental way obtain a lodgement against a roughened spot of a tooth, or in some depression or fissure, or in some interspace where fermentation may take place; in this nidus they rapidly increase, feeding upon any organic matter in reach, thereby excreting acids, principally lactic acid. This acid abundantly excreted by these germs, promptly attacks in a chemical way the lime salts of the enamel and dissolves them away. The bacilli are not small enough to penetrate the minute spaces between the enamel prisms, but the rods are gradually decalcified by the acid, and finally the enamel is penetrated, when a more aggressive warfare begins. The opening made by the action of the acid soon becomes filled with all kinds of destroying bacteria. These consume the organic tissue found in the dentinal tubuli, at the same time excreting more lactic acid, which in turn still breaks down more of the walls of the tubules, so the destructive process supports itself while it advances. After the process of decay has reached the dental pulp the germs find rich soil for their growth, here they set up a severe inflammation, which becomes worse as the germs increase in number and activity,

finally unable to stand the attack it soon breaks down into a foul pus organ. When the pulp chamber is open, all possible species of bacteria may, of course, be brought into contact with the pulp.

Thus far the bacteria which have been considered are of the aerobic type, or those which grow only in the presence of air. It is hardly possible that we should have any of the other type, viz:—the obligatory anaerobic, or those which grow only in the absence of air, except in closed chambers. After a series of experiments along this line I was able to cultivate and study to my satisfaction that germs of the strictly anaerobic type may be found in closed pulp chambers. Several teeth with open pulp chambers were examined and cultures made from material taken adjacent to and remote from the external opening, and in no case was I able to find a strictly anaerobic germ, although a few facultative forms were found.

I have been unable to find record of a single obligatory anaerobic germ of the mouth which has been isolated and studied. Miller in his work on the "Micro-organisms of the Human Mouth," and under the head of "The Bacteria of Diseased Pulps," (p. 96), says: "Since the access of air, particularly in case of closed pulp chambers, is very limited, we should expect to find a preponderance of anaerobic or of facultative anaerobic bacteria."

The first obligatory anaerobic germ that I isolated and studied was obtained from the unexposed pulp of a lower, third, left molar. The patient had worn a gold crown upon the tooth for about one week when it began to trouble him. The tooth was slightly sensitive to thermal changes before it was crowned, but the sensitiveness still increased until the patient suffered from a severe throbbing toothache. The tooth was then extracted. I removed the crown and found over the pulp a thick layer of semi-decalcified dentine. The tooth was sterilized by passing it back and forth through the flame of a Bunsen burner, care being taken not to overheat the specimen and kill the germs. The pulp chamber was next carefully opened with a sterile bur. The pulp was found highly congested and no perceptible indications of pus, or odor could be detected. Cultures were made from the pulp on the different media under great precautions to prevent any contamination. They were then incubated under the absence of air for 48 hours at a temperature equal to that of the body. Examination of the colonies showed a long, narrow bacillus, with rounded

ends and perfectly straight; occasionally may form short threads, but the germ usually was found single. When grown on some media it formed a spore at the end with a club-shaped enlargement. Active serpentine motion was also observed at times when examined in the hanging drop.

As the consideration of the minor characteristics of the germ would consume too much time, I will pass on to the pathogenic effects. Five white rats and three guinea pigs were inoculated, some subcutaneously, others intraperitoneally, with a glucose bouillon culture. Four of the rats died within periods ranging from five and one-half to ten days and one guinea pig died two and one-half days after inoculation. Post-mortem examination failed to reveal the germ in any of the internal organs, blood or lymph.

The second obligatory anaerobic germ that I found was obtained from an upper, right, third molar. Very extensive decay and pulp almost exposed; only a thin layer of semi-decalcified dentine over the pulp. Patient troubled with severe toothache at night. Tooth was extracted, pulp exposed under sterile conditions. Possibly a little gangrene on the surface of the pulp. No perceptible odor or pus. Pulp pale next to decay, but color normal in other parts. Cultures were made on the different media and put under the same conditions as the case just described. The colonies, germs and general characteristics were so similar to that of the other germ that it is not necessary to dwell upon its peculiarities. They may be one and the same germ, although cultivation failed to make the two experiments tally throughout. The pathogenic properties of this last germ were not so severe as with the first one. Both germs after a time gradually became attenuated and failed finally to produce death.

The question now which comes to our mind is: How is the infection of the dental pulp brought about? I shall name three theories which have been accepted by a large portion of the profession:

1st. Through the medium of the blood. There can be no doubt that bacteria which have entered the blood through wounds may be deposited in the dental pulp as well as in any other part of the body, wherever there may be a locus minoris resistance (point of less resistance) at the time. This manner of infection suggests itself particularly in connection with the necrotic pulp,

but we have, unfortunately, no means of determining with certainty, whether and with what frequency, infections of this kind take place.

2d. It has been suggested that bacteria may work their way to the pulp through the thin layer of cementum and dentine at the neck of the tooth. It is, however, rather doubtful whether they can traverse the cementum and very fine ramifications of the dentinal tubules, unless caries is present. This point might and should be determined by microscopical examination of an adequate number of sections from the neck of the tooth.

3d. The chief channel of infection is through the decayed dentine. This point might almost be taken for granted, but it may be of interest to note that in a case of suppuration of the pulp, sections made of the dentine showed the same forms of bacteria as were found in the pulp itself.

The irritation of the pulp brought about by the products of decomposition in the carious dentine render it more susceptible to the action of the bacteria themselves. The question whether an infection of the pulp may take place as long as it is covered by hard dentine must be answered in the positive sense.

I hope what has been said in this mere outline of this subject may suffice to show you what an extensive influence the condition of the mouth exerts in determining the general state of health of the whole body, and how necessary it is that every one practicing medicine or dentistry should be thoroughly informed on this subject. We ought to impress it upon the mind of every patient, that it is as much his duty to keep his mouth aseptic and sterilized as it is to keep his skin clean. In so doing we not only lessen the possibility of infection, but we also destroy a center of disease. It is not an easy matter to render the mouth reasonable asceptic. To make it sterile is impossible. We should then make use of the best means we now have at our command to accomplish this in a measure. The use of a good tooth-brush, tooth-powder, tooth-pick, floss silk, etc., combined with an antiseptic wash, will have a marked effect when used freely and often.

#### DISCUSSION

DR. L. P. BETHEL: I am pleased to learn that Dr. Whinery has been investigating along this line and I hope that he will continue the good work begun, for there is certainly a great oppor-

tunity for investigation in this direction. As yet there is little known about many bacteria, especially those that are anaerobic or those that are non-cultivable on artificial media. Regarding strictly parasitic bacteria present in the mouth and teeth, I doubt whether there are as many varieties as we are led to believe. If they are so prevalent it seems as though we would more often have affections of the tissues of the mouth than we do. Because some of the bacteria will not grow on artificial media, such as we have yet been able to make, is it proof that they are strictly parasitic? Some authorities say that it is on account of the bacteria being so sensitive to even a slight change of temperature. If this is true, warm or hot antiseptic solutions, or even hot and cold drinks, ought to affect or destroy the life of these germs, although they are, of course, more resistive in their natural habitat than when removed to artificial media.

The organisms of the mouth and teeth that do grow on artificial media, cannot be studied with certainty of exactness on account of the life processes being modified by the difference of composition of this media and the natural food and even temperature of the mouth.

Regarding the strictly anaerobic bacteria in the teeth, I do not doubt their existence, although I believe they are comparatively few. The great majority are either aerobic or facultative anaerobic. Out of curiosity, about a year ago, I took some freshly extracted teeth, containing both gold and amalgam fillings, that had every appearance of preserving the teeth, and decalcifying them made sections to see if any bacteria had penetrated the tubules farther than the depth to which the decay had been removed, preparatory to filling. I found that in every case bacteria had penetrated the tubules more or less beyond this point, and some of them to quite a depth. If then we do not get rid of all the bacteria, what is the result? Will decay continue? In these sections there was no evidence of a continuance of caries. The bacteria were comparatively few and somewhat scattered, apparently having lived but a comparatively short time after the fillings had been inserted. The non-continuance of decay may have been due to the bacteria being aerobic and therefore unable to exist but a comparatively short time after the fillings had been inserted; or, if anaerobic or facultative anaerobic, the acid generating or peptonizing properties were insufficient to supply enough

of these agents to affect the lime salts and prepare the albuminous material for appropriation, and consequently they would die of starvation. It should be borne in mind that bacteria do not take food into the body, as do anamalcula, appropriating the nourishing portions and subsequently eliminating the non-nutritious residue. On the contrary, bacteria live on preformed organic matter, either in solution or brought into solution by their own peptonizing powers, before it can be appropriated. They then take it up by absorption, somewhat as a sponge will take up water. There is ample field for investigation in bacteriology, and I hope that Dr. Whinney will continue his researches along the line he has begun.

DR. H. F. HARVEY said it was necessary for the dentist to use antiseptics and aseptic precautions. He spoke of the ways in which the tooth pulp could become infected, the principal one being through decay of the dentine. Is it policy to leave a portion of partially decayed tooth substance in a cavity that we are to fill? Will the filling prevent further decay or will the decay be continued and eventually affect the pulp?

DR. H. A. SMITH referred to Dr. Hugenschmidt's article in the *Cosmos*, and said that mouth-washes are not as efficient as could be desired, on account of the brief time they are left in the mouth to act on the organisms. We do not leave them long enough: they should be left from ten to thirty minutes to be most effective.

DR. J. TAFT thought there was danger of the bacteria penetrating the thin layer of dentine, partially decayed, that is sometimes left in the cavity when filling, and gaining access to the pulp, cause trouble. We find some dentine more resistive than other varieties and this should be taken into account. It is an excellent plan to use antiseptics after the cavity is prepared and before filling, the only difficulty is that they do not penetrate to a sufficient depth to destroy all bacterial life.

DR. J. R. CALLAHAN said that formalin would penetrate the tissues. He would suggest a mild cataphoric current with the antiseptic.

DR. C. T. WHINNEY spoke further regarding his experiments and added that metal fillings themselves would have a more or less antiseptic action on the bacteria left in the tubules of the dentine.

## Dental Legislation.\*

BY GEO. H. WILSON, D.D.S., CLEVELAND, OHIO.

IN writing a paper upon this subject, we make no claim to a scientific discourse, but shall endeavor to point out the deficiencies in our present law, and shall hope to evoke a discussion that will result in a more perfect one.

It is not necessary at this late day to make a plea for dental laws, as every commonwealth in this Union has dental legislation except the States of Idaho and Nevada, and the Indian Territory and Alaska. British America, Europe, Australia, Japan and some of the islands of the sea have more or less valuable dental enactments, also portions of South America and Africa.

A very natural inference is that dental legislation is a child of dental associations, but this is not necessarily so; Arizona and Wyoming, of our own country, have very good dental legislation, but no dental society (organized). Some foreign countries have more or less rigid examination laws, but no associations. The Argentine Republic is very rigid in requirements. Their students must have a preliminary education equivalent to our B. S. or A. M. before they can enter upon a two years' course of dental study in their university. A foreign educated dentist must pass the same examination as their own students before he will be permitted to practice, and this before a committee consisting of three "academicos" and five professors, the dean of the medical department of the university presiding. Brazil has but one society, and no dental journal, but enacted its first dental law in 1854 and another in 1891. She requires all foreign-educated dentists to pass the examinations of her Examining Board. In 1894 Belgium, the Netherlands, Portugal, Servia, Spain and Turkey-in-Europe had laws regulating practice, but no dental societies.

From "The History of Dental and Oral Science in America," published in 1876, we quote the following paragraph:

"Curiously enough, the first State to pass a dental enactment in this country was Alabama, almost the poorest at the time, in skilled dentists, of any State in the Union. This legislation (probably the first ever had on the dental specialty), was some-

\* Read before the Ohio State Dental Society, December, 1896.

what anomalous, placing the keeping of dental interests entirely in the hands of the general surgeon and physician. The old and now well-known objections to such a course operated then much more actively than they do at present."

Dr. Chapin A. Harris, in commenting upon the Alabama law in the *American Journal of Dental Science*, says: "Much may be done, even in this way, but the true remedy lies in the general union of the educated dentists in a central association, aided and sustained by State societies. Such, acting with as much power from the State laws as surgeons and physicians have, will be able to make the profession honorable, respectable and useful."

While it is the duty of the State, and she does enact laws for the health, comfort and happiness of her citizens, it is also true that the controlling and restraining enactments may be of benefit to the individual members of a vocation, so that the reputable members of the calling may be united not only in fostering, but in improving the statutes. Hon. Charles G. Garrison, M. D., a member of the New Jersey bar, author of the article upon "Dental Jurisprudence," in the *American System of Dentistry*, says: "In the United States the spirit of the law favors the right of every man to practice any business or calling that he may elect, subject only to those State laws which are enacted for the protection of society from imposition and danger. Until within a few years this one principle of professional legislation has been all the law has contemplated. In all civilized countries there is special legislation for the children of unnatural parents, and those like Topsy. Pardon the comparison, but it conveys the idea.

From these few statements, and the known history of the profession, I believe every candid dentist will admit that the State is the primary mover in dental legislation, and that, by this legislative control, the best interests of society and the profession are subserved; also, that it is a mark of loyalty to the State and profession when members of the profession exert themselves to enforce and improve the statutory measures.

The Alabama law, approved December 31, 1841, had four sections:

Section 1. Empowering the State Medical Boards to examine and license applicants to practice dentistry.

Sec. 2. Creating a penalty of \$50 for each offense.

Sec. 3. Making all charges of a non-licensed dentist uncollectible.

Sec. 4. Requiring all practicing physicians, surgeons and dentists to have their licenses recorded in the office of the clerk of the county court.

New York was the next State to enact a dental law. A bill, composed of fifteen sections, was approved April 7, 1868. This bill was headed "An Act to Incorporate Dental Societies, for the Purpose of Improving and Regulating the Practice of Dentistry in this State." The bill provided for the formation of eight district dental societies, and a State society. The State society was empowered to appoint eight censors, one from each of the district societies, with power to examine, grant diplomas, and license the qualified applicants.

We quote Section 9 verbatim:

"Sec. 9. All dentists in regular practice at the time of the passage of this act, and all persons who shall have received a diploma from any dental college in this State, and all students who shall have studied and practiced dental surgery with some accredited dentist or dentists for the term of four years, shall be entitled to an examination by the board of censors. Deductions from such term of four years shall be made in each of the following cases: 1. If the student, after the age of sixteen, shall have pursued any of the studies usual in the colleges of this State, the period, not exceeding one year, during which he shall have pursued such studies, shall be deducted. 2. If the student, after the age of sixteen, shall have attended a complete course of lectures of any incorporated dental or medical college in this State, or elsewhere, one year shall be deducted."

This law was twice amended in '79, and again in '81, '89 and '92. Their present most excellent law was signed by their Governor May 12, 1895. This law repealed all of the amendments and all of the original law of '68, except that portion relating to the formation of the eight district and the State societies.

Just thirty-one days after New York adopted her first dental law, Ohio approved her first dental enactment, May 8, 1868.

This bill had three salient sections:

1. Making it unlawful for any person to practice dentistry for a compensation without first having a diploma from a reputable dental college or a certificate of qualification from the State Dental Society or a local society auxiliary thereto.

2. Creating a penalty of \$50 to \$200.
2. Placing the prosecution in the Court of Common Pleas, and the fines to the credit of the common school funds.

On March 10, 1873, the bill was amended by striking out the words "or by any local society auxiliary thereto," and added these words, "that in all cases where any person has been continuously engaged in the practice of dentistry for a period of five years or more, such person shall be considered to have complied with the provisions of this act, and to the act to which this is amendatory."

This law remained upon the statute books until April 8, 1892, when it was amended so as to create a board of five dental examiners, appointed by the Governor, whose duty it shall be "to carry out the purposes and to enforce the provisions of this act." The law provides for the registering of all legal practitioners of dentistry; the issuing of certificates of registration to the graduates of any reputable dental college who may desire to practice dentistry within the State, to all persons in practice prior to July 4, 1889, and to any applicant for examination found proficient in the branches usually taught in a dental college. The law requires that the certificate of registration shall be kept in a conspicuous position in the possessor's place of business. It also makes it the duty of the prosecuting attorney of each county in the State to prosecute every case to final judgment whenever his attention shall be called to a violation of the law. The penalty for the violation of the provisions of the bill is \$25 to \$100 or be fined not less than ten days or more than one month in the county jail—or both.

This bill was again amended May 21, 1894; the amendment passed both branches of the legislature the last day of their sessions. As the amendment is short, but pregnant, I will quote it in full:

"HOUSE BILL No. 651—An Act to Provide for and Encourage a more Scientific Study of Dentistry.

"Section 1. *Be it enacted by the General Assembly of the State of Ohio, That Section 4404, of the Revised Statutes, as amended April 8, 1892 (87 O. L., p. 237) be supplemented as follows, with sectional numbering 4404a; Sec. 4440a. That for the purpose of this act, colleges of dentistry shall be considered reputable which are under State control or are organized, controlled and*

governed by a board of trustees, as provided by law for governing colleges of medicine, which possess buildings, by lease or otherwise, and equipments valued at not less than five thousand dollars, which have a graded course of study of not less than three years; the time of instruction in each year not less than six months; and which have a curriculum which includes anatomy, physiology, histology, pathology, chemistry, microscopy, *materia medica*, metallurgy; operative, mechanical and surgical dentistry.

“Sec. 2. This act shall take effect on and after its passage.”

While it is impossible for the Governor to look after the interests of the various professions unaided, it is right that he should have the appointing power, because the primary interests are the State's, and he is the representative of the State; but the profession interested is the most capable of giving worthy advice. The second weak point in the law of '92 is, that while it makes it the duty of the prosecuting attorney to prosecute all offenders, it does not provide a means for procuring the evidence. The *despicable* portion of our law is the amendment of '94. It was conceived as a scheme, passed the legislature by a scheme, and is a scheme from beginning to end to deceive. Let us analyze it: The claim is, “An act to provide for and encourage a more scientific study of dentistry.” Section 4404a has for its purpose defining what shall make a dental college reputable in this State, and not as the heading reads, “To provide for and encourage a more scientific study of dentistry.” Conditions of reputability:

I. Under State control. This is a condition which does not exist in this State, but sounds well, so it is inserted.

2. Condition. “Organized, controlled and governed by a board of trustees, as provided by law, for governing colleges of medicine.” This may, or may not, mean much. It is a very easy matter for a few designing men to operate together and secure the consent of a few more to permit the use of their names upon the Board of Trustees, provided they are not required to attend the meetings. Then it is quite easy to secure a few worthy people who will attend, but this class must be less in voting strength than the original interested parties; so this may, or may not, mean much. But this amendment has certain requirements: 1. That the institution shall possess, by lease or otherwise, buildings and equipments valued at not less than \$5,000. We will suppose that the few men proposing to form a dental

college have no money to buy, so they lease property valued at \$5,000, at 10% or \$500 a year, or \$41.67 a month. The law requires that the school shall have a certain curriculum, but this must necessarily be on paper at first. Is it not apparent that the veriest diploma-mill can be legalized in this State upon an expenditure of not more than \$50 per month? What is this curriculum that is to so wonderfully uplift the dental profession, that the State of Ohio must have a special enactment? It is the list of subjects found in Section 4404, Article 3, required of a non-college student, to be admitted to practice in the State. Why is this enacted into law as a distinctive mark of a reputable school? Now, what have we in this amendment for the advancement of dentistry not found in the law of '92? Nothing but the leasing of \$5,000 worth of property, or associating with some institution that has leased that amount of property. I pronounce this amendment a deception and a fraud—an insult to the whole profession. Why should this be done?

The State has no need for educational institutions that require special enactments to make them reputable. The dental profession has no need for a school that is established for the purpose of giving occupation to a few men, whether fresh from college or older men that have not made a success otherwise, or as a money-making scheme for a few men, either medical or dental.

We now have nearly sixty so-called dental colleges in this country, and probably not less than 7,000 students attending them this year. Is it not apparent that we do not need more schools, but better ones? Is it not a fit subject for legislation? Should not all professional schools be under State control, and no new ones incorporated, unless it is apparent that the State is in need of greater facilities for giving professional training? Should the State not require that an organization, desiring a charter for a dental school, shall show that it will have suitable quarters and equipment equal to the best schools in the country and an endowment fund sufficient to secure competent teachers?

With the conditions as described before us, I believe that not only the State Society, but the whole profession is desirous of redeeming our State from being the inviting field for all kinds of dental quackery. We are practically helpless and something should be done at the earliest possible moment.

As a basis for discussion I suggest the following synopsis for a new dental bill:

1. A board of four dental examiners, to consist of the State School Commissioner and three members of the dental profession, appointed by the Governor from nine nominees selected by the State Society. The duties of the commissioner will be to inspect, at least once a year, the dental schools of the State; inspect the building and equipments, and examine the admission-credentials of each student and report his findings to the Governor. He is also to report all schools (dental) that have a standard equal to our own, and these schools only are to be recognized by this State. It shall be the duty of the dental members of the board to examine, in the branches of study of a college curriculum, only such applicants as are graduates of the schools commended by the commissioner and those persons who may desire to practice in the State, that have been legal practitioners in another commonwealth for not less than ten years. They shall license all successful candidates, keep a complete record of all licenses, prosecute all violators of the enactment and render an annual report to the Governor. The board to be composed of men in no way connected with a dental school, except he may be an alumnus, and no two graduates from the same school.

2. *College Requirements.*—Every student for admission to a dental college of this State shall present credentials of not less grade than a common-school teacher's certificate until the fall of 1900, when a high-school diploma or its equivalent shall be required. The college course shall consist of three scholastic years, of not less than seven months. At no time shall the standard of the State be less than that of the National Board of Dental Examiners. To secure a charter for a new dental college in the State the application shall have the approval of the commissioner and two members of the Examining Board, and an affidavit of the possession of an endowment fund which shall be sufficient to render an annual income of not less than \$2,000.

3. *Assessments, Fines and Compensations.*—Each applicant for examination shall pay an assessment of \$20. Each violator shall be fined from \$50 to \$200, one-half of which shall go to the common-school fund of the county, and the other half to the treasury of the Dental Board. Each member of the board shall be compensated in a sum not exceeding ten dollars a day and necessary mileage for time actually employed. An attorney may be employed by the board to assist the prosecuting attorney, and be paid from the treasury of the board.

Under these three headings all the items for a complete dental law can be grouped. This society, recognizing the defeat of its bill before the legislature last winter, should take action whether it desires to make farther effort in this direction or not.

If it is thought best, a committee should be appointed and empowered to proceed at once to draft a new bill, and also to organize the whole profession of the State.

I will close by giving a few facts gleaned from the various State laws.

#### THE APPOINTING POWER.

*New Jersey*: The State Society recommend five dentists to the Governor, whom he shall appoint.

*Alabama, Kentucky and Louisiana*: The State Society.

*Colorado*: The Governor, by the consent of the Senate.

*District of Columbia*: Commissioners of the District.

*Indiana*: Governor, one; State Board of Health, one; State Society, three.

*New York*: Board of Regents, upon nomination of the State Society.

#### DENTAL COLLEGE DIPLOMA REQUIRED.

*Colorado*: Diploma or license from some other State,

*Minnesota*: Diploma and examination.

*Missouri, Nebraska and Wyoming*: Require diploma for registration.

*New Jersey*: Diploma, or five years a registered pupil before examination.

*Washington*: Diploma, or ten years' practice before examination.

*New York*: Diploma, and examination by Board of Regents for license.

#### DEBARRED FROM SERVING ON BOARD.

*Massachusetts*: Any pecuniary association with a dental school.

*New York*: Any member of a faculty of a dental school.

Pennsylvanians will present a bill to their legislature this winter, in which they desire to create a Dental Council consisting of the President of the State Society, the President of the Board of Sanitation, and the Commissioner of Education. This council is to act in conjunction with a board of five dental examiners.

## ALL SORTS.

**Toxaemia during Cocaine Cataphoresis.**

Dr. Henry J. Moore, cites the following case in *Items of Interest*:

"As many dentists seem to doubt the possibility of getting the toxic effects of cocaine, by the method of cataphoresis, it may be interesting to place on record a recent experience of mine. I had occasion, in the mouth of a young man, to crown an upper lateral which had been broken by an accident. As I had to destroy the pulp, I applied arsenic, and within a few hours I removed it, using cocaine with the electric current. I was compelled to apply the cocaine higher and higher up in the canals in order to complete the operation with perfect anæsthesia. At the end of twenty minutes I noticed that the pupils of my patient's eyes were much dilated. I was working by gas light, and consequently did not observe any difference in his color. I asked him whether he felt all right, and he replied that he noticed an increasing sense of discomfort and was feeling very faint. I fortunately had no difficulty in restoring him by administering several strong doses of whisky, and was enabled to complete the operation. I had not used much cocaine, and had not applied it continuously. It has always seemed to me that the quantity used is not a criterion, as one subject will support much less than another."

I subsequently discovered that in this particular case the foramen was abnormally large, thus allowing the more ready passage of the current and of the cocaine."

**Anchoring Gold in Cement.**

To accomplish this you must have a thorough dryness of the cavity, using chloroform or absolute alcohol to dehydrate it, so that the cement adheres and penetrates the tubuli, otherwise if the strain is great, it is liable to tear away; also, prevent the cement from passing over the free margins of the cavity. It might be possible to burnish the gold to cover the margins, but I do not think it good practice to permit the cement to come to the enamel edge. The carelessness of the ordinary operator is so great that a method such as this introduces begets poor work. I believe that this operation has a place in our practice that cannot be ignored, especially for nervous patients and children. I should not advise depending too much on the adhesive properties for anchorage.—R. H. COOL, *Stom. Gazette*.

### My Experience with Cataphoresis.

Threats of patent litigation forced me to give the subject of cataphoresis more than a casual investigation, but I did not give it any practical trial until after the valuable paper read at the Ameridan Dental Association by Dr. W. H. Gillett. The claims therein made by such an authority compelled me to lessen my skepticism as to the efficiency of a current of electricity in bringing about that much to be desired condition which would enable us to prepare sensitive teeth for filling without that excruciating pain which we were constantly inflicting upon our patients. So I began to experiment and found the use of cataphoresis so satisfactory that nothing could now induce me to be without it in my practice, and nothing but my own personal experience could have convinced me of what can be accomplished.

I am being overwhelmed with inquiries something like this: "Can you really take a very sensitive tooth and with the aid of cataphoresis render the tooth insensible to the bur?" And such questions come from the most intelligent men in the profession. For the benefit of them and others I will state emphatically that I can render any tooth with healthy circulation free from pain in the preparation of a sensitive cavity, or in other words, can reduce extremely sensitive dentin to insensibility. To do this the following conditions must be rigidly observed: You must have absolute dryness as a flow of saliva will conduct the current away from the tooth upon which you are working. There must be no metal fillings exposed to the current. The positive electrode must be kept firmly in the cavity or cavities, and must not be allowed to come directly against the enamel of any of the teeth. Failure will result if any of these precautions are neglected.

How to conduct the current to the tooth. The first step is to secure absolute dryness, which necessitates the careful adjusting of the rubber-dam. To obviate the necessity of using a clamp, which is always more or less unpleasant and in the way, I find that the dam can be held securely in place by oxyphosphate of zinc. The teeth should be thoroughly cleansed before the dam is put on, and after being adjusted it should be held in place by a properly curved instrument, the moisture wiped from the necks of the teeth and a small quantity of oxyphosphate applied to them. It soon becomes hard and is not affected at all by moisture and the dam cannot be worked loose by the patient. It can also be held in place in the same way when the cavity is under the margin of the gum. When the dam is properly adjusted and dryness secured, the cavity should be opened and as much of the soft decay removed as is possible without causing pain. Next, any metal fillings

which may come in contact with the electrode must be insulated. To do this I have had great success in the use of a thin solution of aristol dissolved in chloroform. The chloroform soon evaporates and the aristol adheres with great tenacity to the clean surface of the teeth or fillings. Wax or gutta-percha will answer the same purpose, but something must be used which will prevent any contact of the metal filling with the electrode or cocaine.

Instead of using in the cavity the platinum point, which must be held steadily with the hand or secured by some appliance, thus taking time and effort, I use a small piece of fine German-silver wire, 32 gauge. One end of this wire is attached to the positive electrode and the other is wound around a pellet of cotton large enough to fit tightly in the cavity. It will remain there firmly and give the operator the freedom of his hands, enabling him to work in some other part of the mouth, which I frequently do while anesthetizing a tooth, or to work for another patient until the dentin is obtunded. I use the German-silver wire which has a double cover of cotton or silk, of course removing the covering from the end which is attached to the electrode. The question of discoloration resulting from the use of German-silver wire has been raised, but I have never yet seen any deleterious effects from its use. If you wish to use platinum wire, or any wire which is not covered, it may be coated with the aristol and chloroform above mentioned and thus be insulated.—J. N. CROUSE, *Dental Digest*.

### A Useful Flux.

A flux that is exceedingly useful in bridge-work is prepared as follows:

Put in a cup—

Boracic acid	-	-	-	-	-	-	1 oz.
Ammonia	-	-	-	-	-	-	$\frac{1}{2}$ oz.
Carbonate of ammonia	-	-	-	-	-	-	$\frac{1}{2}$ dwt.
Bicarbonate of soda	-	-	-	-	-	-	2 dwt.
Water	-	-	-	-	-	-	4 oz.

Boil until the fumes of ammonia are no longer given off.

Coat the bridge or other work all over the gold with the flux. Heat it over a spirit lamp to dry it on. Give it another coat, if needed, leaving no part exposed. Then scrape off where it is desired that the solder shall flow, and it will go nowhere else. The work will come out of the heating as bright as when it went in, and the solder will be smooth. The polished surfaces will not be corroded or blackened.—*Western Dental Journal*.

**Mistakes.**

From a paper read before the Chicago Dental Society, by T. W. Brophy, and published in the *Dental Review*, we abstract as follows:

**A SOCIETY MAN.**

"When a dentist devotes all his time, outside of his practice, to the society of the laity, to the exclusion of matters pertaining to his profession, he makes a mistake. Every one of a social nature, enjoys the society of neighbors and friends, but the dentist who would rise above the mediocrity of his profession must read dental journals, attend dental meetings, write papers on dental subjects, discuss other papers, and become an active man among his confrères. If he does not thus assist his associates and by so doing broaden and advance himself, he makes a mistake.

**READ THE JOURNALS.**

While our journals often publish articles of little or no value, there is enough in them to interest and benefit the most scholarly men in our profession, and to fail to keep in touch with the best thought in dentistry, as presented to us through the medium of our periodicals, is a great mistake.

**HASTY DIAGNOSIS.**

It is a mistake to be hasty in making a diagnosis. No dentist should venture an opinion or make a statement to a patient as to what the nature of his disease is until he has given the case enough careful consideration to enable him to determine beyond doubt its true character. A dentist should not hastily say that his patient's teeth are in a good state of preservation until all the surfaces of the teeth are critically examined. Should the conditions presented make it necessary, proximal surfaces should be exposed to ocular examination, so that the operator may be certain as to what treatment, if any, will be required.

**RETAINING PITS.**

It is not easy to account for the views of those who persist in drilling so-called "retaining pits" in almost every cavity filled by them with gold. The vitality of many a pulp has been destroyed by such a practice. Retaining pits are almost always not only unnecessary, but they are a positive injury to the tooth in which they are made and whoever uses them should discontinue the practice, as he is laboring under a mistake. Retaining pits, like cotton root fillings, were discarded by the best element of the profession many years ago; such methods have no place in modern

dentistry. During the past week I have had occasion to treat a young woman who has lost the pulps of the superior central incisors, due to the unnecessary use of retaining pits.

#### REMOVE DEPOSITS AND STAINS.

It is a mistake to begin to prepare and fill teeth before removing salivary calculus and stains. No operator can tell the requirements of a case until the surfaces of the teeth are bright and free from discoloration, so that the line of demarkation between the normal and the diseased tissue may be clearly observed.

#### SEPARATE TO OBTAIN ROOM.

It is a mistake to attempt to fill proximal cavities without having a good deal of room in which to work, and to secure enough room it is usually necessary to wedge the teeth apart a few days before operating.

#### PRESERVE THE DECIDUOUS TEETH.

The average dentist, I think, is not apt to teach his patients the importance of preserving the deciduous teeth. He does not impress upon his patients the necessity of thorough cleanliness of the mouth and teeth. Many mothers, otherwise well informed, seem surprised when asked if they carefully brush the infants' teeth mornings and evenings. Often-times they say that it does not seem necessary as the baby's teeth are so bright and clean. The mother makes a mistake by omitting this important service to her child, but it is because she does not understand her duty. It is not always her fault; more frequently it is the fault of her family dentist or physician, to whose neglect of duty the mother's education has been neglected. The most important place a dentist fills in the community in which he lives is that of a teacher. I believe that 80 per cent. of the people, perhaps more, have no knowledge of the laws of hygiene as applied to the oral cavity; and believing this as I do, I desire to see all dentists and all physicians become active in informing the people in regard to this important subject. No one will question the breadth of the dentist's sphere if I am right. If 80 per cent. of the American people require instruction in oral hygiene and in regard to the diseases of the teeth, 48,000,000 are uninformed.

#### RUBBER PLATES OBJECTIONABLE.

I am sure the profession is making a mistake in continuing in an extensive way the use of rubber as a base for artificial teeth. There are other materials much better, and nearly if not quite as cheap. Rubber is objectionable because it is not a good conductor of thermal changes,

and consequently the tissues which it covers are almost always kept in an abnormal state. Aluminum has great merit as a base, and when the teeth are attached with rubber the plate is vastly superior to rubber, and nearly as cheap.

The dignity of a profession is dependent upon the conduct of its members.

#### FEES.

Dentistry will never hold as high a place in the estimation of people of culture and education as law, theology and medicine until we arise and do our duty to ourselves. The man who will not presume to call upon a physician and receive advice and a prescription, which would be given in ten or fifteen minutes, without expecting to pay a fee, would call on you, occupy a half hour of your time for advice, and feel that all the compensation necessary would be to intimate that he might possibly some time favor you with another call. The man who would willingly pay \$100 for a minor operation requiring twenty minutes' time would declare that he was imposed upon if you charged him \$20 for one requiring equal skill and an hour's time. The man who would apply to a lawyer for advice which might be given in fifteen minutes will expect to pay a fee. But the same man will go to a dentist to have a tooth with an exposed pulp treated, and perhaps make five or six visits before the tooth is put in a good state of preservation, and when his bill is sent him will complain because the dentist required a fee for each time his services were rendered; but far more frequently the dentist will do himself the injustice of charging nothing for advice and treatment.

It may be that some dentists think free advice and free treatment will indirectly prove advantageous to them; but anything free is usually regarded of little value, and the dentist who follows such a practice lowers himself in his patient's estimation, lowers the dignity of his profession, spends his energy oftentimes when he should be preserving it, and thus multiplies mistakes."

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#### Uses of Pyrozone.

I have found pyrozone very useful in the insertion of all kinds of crown and bridge work. We all know that bleeding of the gums gives us great trouble in these operations. I obviate this by applying a 25 per cent. solution of pyrozone to the gums, which acts as a styptic, and in my hands has never resulted unhappily. I also use this remedy in the same manner for the insertion of gold fillings at cervical margins, one or two applications rendering the gum perfectly dry for ten or fifteen minutes,

which is ample time for the insertion of an ordinary filling. In the case of abscess with fistulous opening, I use a 3 per cent. solution inserted with a hypodermic syringe, forcing the solution through the fistulous opening, and I find that its use is not as painful as that of oxide of hydrogen. In all cases in which the alveolus has been perforated by the progress of suppuration, and the soft tissues have not yet sloughed, I advise free lancing over the congested parts, and the insertion of a pledget of cotton saturated with a 25 per cent. solution, which should be allowed to remain for a few moments.

For a putrescent pulp, I apply a 5 per cent. solution of pyrozone, which at once disinfects, permitting the removal from the canals of disorganized tissue, without the disagreeable odor which is often so offensive to both patient and operator.

I also use pyrozone for the removal of green stains on teeth, due to organic causes. I use a 3 per cent. solution for this. Apply it with an atomizer, spraying the teeth. I find that this treatment is most efficacious, and also the most pleasant to patient and operator.—DR. WETT-LANFER, *Dental Practitioner*.

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### Physiological Effects of the X-Rays.

In order to obtain a rational explanation for the pathological changes, the attempt will be made to show that they all probably result from one general effect of the Roentgen-ray on the body—that of stimulation. This, however, will not directly account for the tanning of the skin. When the tube is placed but a few inches from the skin and kept in that position for at least one half hour, in a few days a discoloration of the skin takes place. The result in all its symptoms seems identical with sunburn, and whether the Roentgen-ray be ultra-violet light or not, it is well established that such tubes emit ultra-violet light from secondary actions taking place within them. These actinic rays are capable of producing all the effects which follow exposure to sunlight.

From a medical standpoint inflammation results from an increased local activity of the circulation of the blood. Cohnheim found upon stimulating the tongue and mesentery of a frog that the blood vessels dilated. After a time the white corpuscles lined their walls and began to pass through them into the adjacent tissues. Once escaping from the blood vessels, the leucocytes, through their well-known amoeboid movements penetrated the tissues. Coincident with the emigration of the leucocytes, the food constituents of the blood filtered through the walls of the blood vessels by osmosis. Virchow, another eminent authority, claims that in cases where such emigration has occurred the white corpuscles may break down into pus cells.

From some early investigations with Roentgen-rays the writer was led to conclude that the immediate and perhaps only effect on the body was one of stimulation, and that this affected chiefly the white corpuscles, causing them to quicken their amoeboid movements and emigrations, and possibly their proliferation, the action being in general a tonic one. This certainly accounts for the therapeutic effects which these rays have been found to possess. The view here advanced received striking confirmation when the superficial bodily effects are studied. For example, suppose the hand is held near a powerfully excited tube of the focus type for half an hour. The sensations accompanying the exposure are those of heat and stimulation. In the course of a few days the hand grows red and swells, and perhaps blisters will form, and in some cases suppuration may intervene. Seemingly during the exposure the leucocytes were greatly stimulated and began an emigration through the dilated walls of the blood vessels, venous and arterial. During the latent period, lasting over a few days, these leucocytes permeated the tissues and perhaps proliferated to some extent. Co-existing with these changes an exudation of serum took place, causing swelling. The presence of the leucocytes in the tissues would explain the symptoms of heat and pain in the parts affected. This condition of inflammation would continue until the white corpuscles and serous exudations were absorbed, a process which is always a tedious one at best.—W. M. STINE, *Electrical World*.

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### Improved Porcelain Bridge.

The points in this bridge are, you are able to have 22k. gold caps on the bridge, and having a bar through the porcelain to strengthen it, its brightness and cleanliness makes it a satisfactory piece of work in the mouth. The caps are first made and a piece of platinum swaged to fit on the gum and extend up on the mesial and distal surfaces of the teeth that are capped. Then a cross of platinum or pure gold is soldered about the center of the swaged piece and a platinum rod to brace it up and it gives you something to solder the teeth to. After this, if a long piece, standards are soldered on and the body is put on. I recommend Close's body, as Downey's, compared to Close's, is like mud compared to concrete. I consider the bridge the strongest that can be made. Then you put on the gum, and you can build upon the inside and slope it up to where the gum commences. After this you put caps in the mouth and put porcelain piece in position, take out, invest and solder. You make a very strong and perfect joint, and, to my idea of bridge-work, it is perfection itself.—*Stom. Gazette*.

### **Porcelain Caps and Gold Barrels upon Molar Roots.**

In cases in which the stump of a first molar is to be crowned, and where the exposure of the gold of a full barrel crown would be objectionable, the following method at times may be found applicable. The stump is dressed for the reception of a barrel, the buccal wall being cut down to the gum-margin. A barrel as for a full gold crown is made, cut down one-eighth inch short of occlusion, a bite and plaster impression are taken in which the barrel is removed. The articulation is mounted upon a crown articulator.

A scratch is made along the buccal wall of the crown, marking the height of that portion of the stump; the scratch is continued upon the approximal wall, marking the outlines of the segment of gold, which is made visible through the movements of the lips. A measure of the periphery of the top of the barrel is taken by means of a dentimeter, and the circlet of wire set aside. The section of the barrel outlined by the scratch is sawn out. A plain rubber molar having but a thin layer of porcelain between its masticating surface and the cut-away in which the pins are set, is selected; the wire measurement is used as a guide for the size of the tooth; not more than two or three molds of teeth in the largest stocks are of the proper form, which limits the application of this device. A tooth is selected whose cervico-buccal outlines agree with the line of metal in which they are to be set. The wire measurement should slip readily over the borders of the masticating surface of the crown.

A block of soft wax is set in the barrel, the crown pressed in it, and any grinding done which may be necessary to perfect the occlusion and the joint between the porcelain.

The heads of the platinum pins are cut off, the facing cemented into position on the barrel, and the piece is invested, porcelain downward.

The wax is picked away, and a 24-carat backing, No. 34, is fitted to the exposed porcelain, touching the interior of the barrel at all portions of its length. The stay is soldered to tooth and barrel by means of a 14-carat solder. The heating in these cases must be deliberate and uniform.—H. H. BURCHARD, *Cosmos*.

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### **A Method of Making and Shaping Metallic Seamless Tooth Crowns.**

The first step in the principle is to select a band (from a set of twenty, which the manufacturer provides to those using the method,) to fit the root after it is prepared. The band is fitted to the root and is cut away from the labial and lingual side, and is left as high as occlusion will

permit on the approximal side. The band is then filled full of wax, and the patient bites on the wax. The band is then removed and the wax is contoured with a spatula; a plaster matrix is then made; the crown is then swaged perfectly to the metallic tooth, and the metallic tooth is melted out, and the cervical margin only requires to be beveled, leaving a finished crown. By this method the crown is absolutely perfect in fit, contour and occlusion, and is produced at an expense of very little more than the actual cost of the gold.—L. J. WHITE, *Stomatological Gazette*.

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### Dangerous Playthings.

The following cases are cited illustrating the necessity of care in seeing what children have for play-things and how they use them:

A little girl about five years of age was running about a car on a Santa Fe train, with the sharpened end of a pencil in her mouth. A sudden jerk of the car threw her to the floor forcing the point of the pencil through the soft palate. It so happened that the smooth perforation of the palate was the only injury.

The little son of a well-known physician in California was playing with a long handled button-hook. He in some manner got it caught in the soft palate, became frightened and gave it a vigorous pull. Quite an extensive laceration was the result. His father administered an anesthetic, stitched the edges together, thus avoiding a permanent injury.—M. G. J.

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### Peculiar Pathological Conceptions.

Dr. J. D. Patterson read a paper before the Chicago Dental Society on the above subject, concluding with the following summary.

“ The principal points I have endeavored to make clear may be summed up as follows:

1st. That in gout, authorities differ as to whether the deposits follow or precede the inflammatory action.

2nd. That vascular tissues, such as the pericemental membrane, are not subject to the gouty deposits.

3rd. That the dense anatomical structure of the parts about the root of a tooth do not exhibit the necessary bursa or the necessary character of tissue in which gouty deposits appear, unless precedent lesion has caused such space.

These conclusions, if true, all strongly argue against what I have called the ‘peculiar pathological conceptions’ of Dr. Peirce and others upon the subject of pyorrhea alveolaris and the gouty diathesis.”—Extract from *Dental Review*.

### Fowler's Solution as an Obtundent.

I have been using Fowler's solution as an obtundent for more than four years, and have noted no ill effects in connection with its use. I recognize, of course, that it would not do to teach students to use any of the arsenical preparations as obtundents, but as I am talking to experienced practitioners, I present the subject for your consideration. I do not believe a pulp can be killed by its use. I have tried it and failed; moreover, I have never had a case of pulpitis following its use. Of course, an antidote should be applied after using it. I have used Fowler's solution in double strength (two per cent.) and filled the cavity with cement, and after weeks, upon removing the filling have found the dentine sensitive.—*Dr. Register, International.*

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### Oral Acidity.

Among the first indications of the action of acid, locally, upon the dental structure, is the sensitiveness to sudden thermal changes. A slight pain is produced when hot or cold fluids, or when sweets are brought in contact with it, which is soon increased by a perceptible decalcification or chemical erosion of the enamel, producing a roughened surface, and having a special tendency to attack the neck of the tooth where the enamel joins the cement, especially if there be a little recession of the gums, and perhaps is more frequently noticed in patients of the so-called gouty diathesis, and generally gives rise to a chronic inflammation of the gum margin, whether resulting in caries or not.—*Stom. Gazette.*

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### Misfitting Vulcanite Plates.

I have sometimes remedied misfits in vulcanite plates, by the simple process of warming them until somewhat softened, and then allowing them to cool slowly. This warming may be done over the flame, but better, I think, in hot water. Surrounded by water, the heat is perhaps more evenly distributed through the plate than when it is held over the flame.

The theory is, that heat permits the plate to return to its normal shape, the shape given it by the model, if it has lost it.

It was celluloid which gave me this idea. Like many others, I was a victim of the celluloid epidemic of the eighties. One day, on boiling a celluloid plate to remove the teeth from it, I observed that it relapsed into nearly the original shape, that in which it was furnished at the depot,

the "blank." I then tried molding celluloid plates at a higher heat, about 300°, if I remember rightly, and found that these plates would not, when afterwards softened in hot water, return to their "blank" shape but (if purposely bent for the shape of experiment) would return nearly to the form given them by the plaster cast.

This suggested warming misfitting vulcanite plates to restore them to shape, if warped.

The process, however, fails in those dentures which have a new layer of vulcanite over an older one, as when an old plate has been refitted. I presume that the failure is due to the fact that, when subjected to this process, the older vulcanite draws in the direction given it by the original investment, and the newer in the direction given it by the later investment, and that these two are opposed to each other. Indeed, I am disposed to believe that this opposition acts on these plates when cooling in the vulcanizer, producing misfit. It may be that this could be prevented by sawing out the entire palatal portion of the older vulcanite.—S. J. SPENCER, *Items.*

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### Selection of Roots for Crowning.

The selection of roots for crowning, to form supports for artificial teeth requires the dentist's soundest judgment and discrimination. Only those that are firm and free from disease should be saved, and they should be brought into the healthiest possible condition to prevent the occurrence of disease in the future.

Before making the case the roots should be tested for a short time to demonstrate their fitness and reliability for the purpose intended. By testing, I mean that they should be trimmed again to the required shape, the canals should be cleaned out, made perfectly antiseptic and sealed up thoroughly. If they remain in a perfectly quiet condition, in a week one may venture to the crowning process.—H. ROSE, *Brit. Journal.*

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### Tumors of the Superior Maxillary.

These growths are often very insidious in onset, and may be far advanced before the patient is aware of their presence. They commonly commence in cavities quite inaccessible to exploration, and are only manifest when they begin to encroach on the skin or mucous membrane. In all cases in which a deep-seated tumor of the superior maxillary is suspected, the nasal passages, the vault of the palate, the pharynx and post-nasal space alike should be carefully explored. When the configuration

has altered and the osseous walls impinge by the use of the needle, it will be found that the bone has become more vascular and is much more friable than normal. From the prognostic point of view, sarcomata with small cells are the most malignant; those with intermediate, hyaline substance are less so; the fibrous-sarcoma with giant cells the least. The endotheliomata progress slowly and often undergo cystic changes, and are but slightly malignant. Epitheliomata here are no less malignant than sarcoma.—M. HAMMER, in *Gazette Hebdomadaire de Medicine et de Chirurgie*.

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### **Putting on Metallic Backings for Vulcanite Work without Soldering.**

Dr. Kissell makes use of this plan in partial cases where patients are liable to break off the porcelain, leaving the pins in the plate. Any metal of gauge 27 or 28, either gold, platinum, or Columbian silver (he uses the latter exclusively), may be used. After the plate tooth is ground in position, a piece of the metal the width of the tooth and one-half to three-quarters of an inch in length is first annealed, then holes cut in it to accommodate the pins of the tooth. The metal is slipped over the pins, and they are bent to form an  $\times$ . The tooth, with the metal in place, is then put back on the model, which is waxed up as usual. When the case is packed the rubber will surround the bent pins and the metal. The advantage of the backing is that it gives strength to the tooth, and it also allows the lower tooth to strike only against the metal instead of the thin porcelain. Rubber will vulcanize very well with Columbian silver, and it will hardly tarnish in the mouth. This process requires but a few minutes' work, and it removes the danger of checking the tooth or diocoloring it by the heat required for soldering, nor is it necessary to have the case invested.—*Cosmos*.

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### **Periostitis.**

I am going to suggest a cure for periostitis. I have a case at the Institute of an extremely loose tooth. It was a question whether the patient would have it out, and the patient said it was a hopeless case, and he would have it out. I have fixed up that tooth with a bar without any bridge or capping, simply slotting the tooth and putting a blade in the slot, anchoring it in with cement, and it has steadied the tooth, which is now remaining in the tooth comfortably and in a very much better condition than it was some months ago. I have known teeth, which have

been weak, strengthened by getting away from the conventional and doing something new, and not taking it for granted that we know all that is going to occur because of our theoretical knowledge.—MR. CUNNINGHAM, *Jour. Brit. Asso.*

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### Crowning Deciduous Teeth.

Dr. Poulson's article in your January number reminds me that when my son was four years of age he accidentally fractured his temporary right central incisor, from which I had previously removed the pulp, subsequently filling the canal and two cavities. I decided to attempt to crown the root, which still seemed firm in its socket. I removed the root filling, slightly enlarged the canal, and fitted a platinum post. Next I burnished thin platinum over the end of root and soldered it to the post. Replacing this I took an impression and bite, and proceeded in the usual manner, using the thinnest of Ash & Son's facings, and grinding to shape and proper size. Even with so thin a tooth I found that the crown would be too thick, and was obliged to grind it to suitable appearance after soldering, the Ash body permitting this, as it can be polished after grinding. I set the crown with thick gutta percha. It looked well and remained in place for five years, the permanent teeth erupting tardily. The root becoming loosened by the approaching permanent central, I extracted it, fracturing the porcelain, but not disturbing the relation between the post and the root. The end of the root had been absorbed so that the gutta percha appeared protruding.—J. V. COLE, *Items.*

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### Manipulation of Heavy Foil.

In manipulating heavy rolled foil it is to be remembered that we are dealing with gold plate, not hammered foil, and our work should be done with a recognition of the physical properties of the material. Like all gold plate, it should be annealed to redness, as any heat below this does not develop the full degree of cohesiveness. Instead of making the gold harsh and hard, as with foil, the heat actually softens it, makes it more plastic. The numbers of foil used in the clinic to-day were 60 and 120. To use these numbers requires absolute precision in manipulation, although perfect welding is accomplished by means of very light blows; each succeeding piece must be added to its predecessor without folding or wrinkling. Rolled foil is best adapted for use in spaces which have a narrow approach. When cut in narrow strips it may be carried to the depths of the cavity, and when the proper care is exercised be perfectly

adapted. Another advantage possessed by it is its perfect welding under slanting blows.—DR. GARDINER, *International*.

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## BRIEFS.

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**Inlays.**—The color of the cement has a considerable effect on the shade of inlays.—*F. J. Ross, Dominion*.

**To know** where and when not to use crown or bridge work, is as essential as to know how to do it.—*Dominion*.

**Cement for Inlays.**—Use fairly quick setting cement for inlays and be sure and mix it thin.—*F. J. Ross, Dominion*.

**A Crown Carrier.**—“Take an orange wood stick, cover it with wax on one end, then carry the crown to place already filled with cement.”—*Rosenthal, Review*.

**To Remove Cement.**—A piece of wet pumice-stone will remove cement from the mixing slab with neatness and dispatch.—*Geo. M. C. Barnard, Dental Digest*.

**Use the Best.**—When you find a cavity, fill it with the very best material, and in the very best manner, however small, and however unremunerative.—*Welch's Monthly*.

**The first object** of filling a tooth is to save it, but it is also good common sense to depend upon that filling with which it may be most easily saved.—*Dr. Brockway, Items*.

**No More Rubber Wedges for our Teeth.**—We prefer the slow method. One experience is quite enough. Use a separator or go slow, is the advice of one who has been there.—*Review*.

**Cleanliness.**—A great many men are everlastingly preaching cleanliness to patients and instructing them to brush their teeth, when they themselves are not clean.—*I. B. Crissman, Review*.

**A Natural Model.**—It is a good plan if one has to extract a front tooth, to save it for reference as to size and color, and for the latter purpose it should be kept in water.—*H. Rose, Brit. Jour.*

**Is Iron an Element?**—J. Parry (*Chemical News*), basing his opinion on the spectrum of iron and the effect of temperature on the spectrum, comes to the conclusion that iron is not a simple element.

**Use of Corundum Wheel for Fissure.**—The small corundum wheel is much superior to a fissure-bur for cleaning out fissures to prevent the occurrence of decay in molars.—*Dr. Belcher, Cosmos.*

**How to Work 'em.**—To work a machine, oil it well, tighten securely, start it confidently; to work a man, oil abundantly, tighten cautiously, start him with fear and trembling.—*Odont. Journal.*

**Bridge or Plate?**—If you have a tooth likely to last several years, it is better to have a small crown or bridge than to use an artificial plate and run the risk of injuring several teeth.—*Dr. Whittaker, Jour. Brit. Asso.*

**To Burnish or Buff Thin Tin or Lead Air-Chamber Forms into Place.**—Use the rubber-end of a lead pencil. It is also useful for holding crowns in place while the cement is "getting ready" to set.—*Odontographic.*

**Ingot Mould.**—For an ingot mould to order use the common black lead, or stove polish, of oblong form. Two of these wired together may be made to answer almost all the requirements of dental casting.—*Odontographic.*

**Test the Powder of Oxyphosphate for Arsenic.**—Sometimes a pulp dies when the cause of death is a puzzle. Perhaps arsenic, which is sometimes found in commercial oxid of zinc, was the imminent cause.—*Dental Review.*

**Treatment of White Spots.**—Cases of white spots of decay on front teeth treated by burnishing such spots with a steel burnisher moistened with pyrozone will prevent recurrence of the decay and save the teeth.—*Dr. Green, Cosmos.*

**Cause of Apical Infection.**—Infection of the tissue beyond the apex of the root is quite often brought about by the careless use of air syringes having powerful bulb attachments. Better to disinfect first, then desiccate.—*Dental Review.*

**Removal of Green Stain.**—Dentists usually remove green stain by means of a wheel and pumice-stone, and the green stain almost invariably returns. If the surface, however, is left perfectly smooth it will not return.—*Dr. Green, Cosmos.*

**Crowning Teeth with Live Pulps.**—I have put crowns on living teeth, and I have inferred from what the patients said that they would rather be seventeen years without the crowns than have another one done.—*Dr. Rheinhardt, Jour. Brit. Asso.*

**Send Patients to a Specialist.**—I consider that I am doing my patient more good by sending him to a specialist, when I feel that I cannot skillfully and properly do the work myself than to make attempts at doing this work.—*I. B. Crissman, Review.*

**A Filling Polisher.**—Dr. Genese, of Baltimore, is of the opinion that Johnston's Ethereal Antiseptic Soap is an exceedingly valuable article to use when polishing gold fillings with burnisher. It acts as a lubricant and polisher as well.—*Therapeutic Notes.*

**Amount of Gold Used.**—In answer to a query, I received the statement from Morgan, Hastings & Co., that annually there are used in the United States 30,000 ounces of gold for filling teeth, which is a very conservative estimate.—*F. J. Fesler, Dental Digest.*

**To Prevent Modelling Compound from Sticking.**—In heating modelling compound, lay a sheet of paper or bit of linen in the bottom of your dish, otherwise the mass will stick to the metal, porcelain or other material of which the dish may be composed.—*Odontographic.*

**Treatment of Neuralgia and Toothache.**—The best method of treatment for toothache and neuralgia, so frequently found in pregnant females, is to inject a few drops of the Edinburgh solution of bimeconate of morphia in the gums over the affected tooth or teeth.—*W. G. B., Dominion Journal.*

**Over Treatment.**—I do believe one of the mistakes that have been made in the past has been too much treatment of root canals, and I am becoming more and more satisfied daily that the profession at large are feeling that it is not necessary to treat root canals as much as they used to.—*C. L. Clifford, Review.*

**A New Antiseptic.**—I desire to call the attention of the society to a new antiseptic—China salt. It is one of the coal tar derivatives, and it may be procured from Mr. Rhode, on North Clark Street. It is used in  $1\frac{1}{2}$  to 3 per cent. solution. It seems to be a wondful antiseptic.—*C. P. Pruy, Dental Review.*

**Never Mind the Other Fellow.**—As a rule I do not like to have a patient tell me where he has been before, when he comes into my office. I do not wish to know who has done this or that. I give such patients very little encouragement to talk and as a rule they keep things to themselves.—*G. Newkirk, Review.*

**Treatment of Sweating Hands.**—The *Journal de Medicine* gives the following: Take of tincture of belladonna, 1 drachm; cologne water 1 ounce. Mix. Add a little glycerin at the moment of using,

and with the mixture rub the hands strongly. The hands should be first washed in soft water and thoroughly dried.

**To avoid the decay** of the mesio-approximal surface of the first permanent molars, near the point of contact with the second temporary molars, it has been my practice to dress away the distal wall of the latter by means of a disk, leaving a shoulder at the neck to preserve a space between the crowns.—*Dr. Register, International.*

**Little Things.**—Men fail in small things. It is the little worm that sinks the ship. It is the small extravagances that bring ruin upon the business house. Take care of the little things and the “big” ones will take care of themselves. Look well to the details and you need never worry in regard to the aggregate.—*Canadian Journal.*

**Stop it, Gentlemen, right off!**—We mean the manufacture of disks from paper whose sand or grit is made to adhere by means of fish-glue. This kind of sand-paper is bad enough when used in the laboratory, but when heated as are disks in the mouth, it develops a rankness fully capable of driving a dog out of a tan-yard.—*Odontographic.*

**Amalgam as a Filling Material.**—My estimation of amalgam as a filling material may be stated by saying, if a good article be used in the same locations, under similar conditions and with equal exactness as in the use of gold, we find it no mean competitor with the fellow-metal in arresting the progress of dental caries.—*G. E. Hanna, Dominion.*

**To Improve Oil-Stones.**—To clean and otherwise improve the working qualities of an oil-stone, smear a flat block of wood with glycerine and fine pumice and rub the stone, face down, till all traces of previous usage have disappeared. To ruin an oil-stone, clean it with kerosene. In hardness it will then rival Pharaoh's nipples.—*Odontographic.*

**False Teeth and the X-Rays.**—The Rontgen rays have been found of the greatest utility at Bristol University College, where a patient has been relieved of a conviction that he had swallowed his false teeth. The rays showed that he had no such thing inside him, and he departed happy in the knowledge that he had merely mislaid his teeth.—*British Journal.*

**A Solvent for Gold and Silver**, which owes its efficiency to the presence of potassium cyanid, is claimed by Johnes Atkins, and is produced by heating a dry mixture of one part of potassium ferrocyanid with about two parts of salt to incipient fusion. The product is poured into moulds, and is quite stable in the air. For use it is dissolved in water.—*Literary Digest.*

**To Combat Dental Caries.**—As to the weapons given us with which to combat decay, the first and most important is cleanliness. Lime water has done its duty and been relegated to the past, giving place to the more modern, pleasant and effective milk of magnesia, which I have used extensively with very gratifying results to myself and my clientage. —*Odontographic Journal.*

**Hygiene in the Manufacture of Matches.**—M. Magitot does not think it necessary to use red phosphorus. According to him, the phosphorism and necrosis will disappear with the employment of white phosphorus, if care be taken to secure sufficient ventilation, and if a selection is made of the workmen, employing only those in whom there is no buccal nor dental lesion.

**Be Honest with Patients.**—Be honest enough to treat all patients as though you expected to see them again, or that you expected your brother practitioner would see them. Not that you want to turn them over to another, but you had rather they would do that than to ever after hold and express an opinion derogatory of the entire profession.—*Dr. Howard, Odontographic Journal.*

**To Remove Modelling Compound from the Model.**—If your modelling compound doesn't come away from the plaster, jab the adherent pieces with the bulky part just removed, always keeping the mass in hand and the pieces on the model quite "tacky." This process will leave the model as clean as if cast in a plaster impression and without a suggestion of injury.—*Odontographic.*

**Warm Solutions of Cocain.**—Da Costa has found that the local anesthetic effect obtained with cocaine is more rapid, more intense, and more lasting if the solution is warm. The dangers of intoxication are thus much diminished, as the quantity of cocaine can be very much reduced if it is warmed. A solution of 0.5 or 0.4 per cent. heated will produce a powerful effect.—*Med. Times.*

**Bleaching Yellow Wax.**—A. Nicolle recommends (*Le Mercure Scientifique*) acetone for use in the decolorization of yellow wax; it not only bleaches the wax, but also has the property of dissolving out an acid which has the properties of acetic acid, and fatty bodies, having a lower melting point than the wax. For complete decolorization it is necessary that the wax be cut up into small pieces.

**Lockjaw caused by a Tooth.**—Dr. Sache (*Centralbl f. Chir.*), reports a case of lockjaw which for four years baffled the skill of several physicians. Dr. Sache found the right superior third molar projected

externally in a horizontal direction, pressing against the internal pterygoid muscle, so that the patient was unable to open his mouth. Eight weeks after extraction of tooth patient could open jaws normally.—*Dental Digest.*

**Lime Salts and the Teeth.**—It has been demonstrated beyond question that all *chemical* forms of lime salts are rejected by the system without having been absorbed. According to Lehman and Heiden, phosphate of lime added to food is excreted in its entirety without any absorption. Phosphate of lime we must have, but only such forms as are presented to the system in organized combination, will it take up.—*Odontographic Journal.*

**Distinction between Articles of Silver and of Nickel.**—The author uses a concentrated solution of silver nitrate. Genuine silver remains bright if moistened with the liquid; spurious articles turn black. Lacquer, if present, must first be rubbed off. The writer, mentions, also, the 10 per cent. solution of chromic acid. A drop of this liquid produces on silver a purple-red spot, but on other metals (except gold and platinum) a greyish-black.—*Chem. News.*

**Cantilever Bridges.**—I am sorry to have to say a word against cantilever bridges. I have seen perhaps a score of these bridges with their abutments resting on unprotected teeth, and the results, if not fatal, have been always injurious to such an extent that I would never insert one without both ends of the bridge being attached to teeth crowns. The result has been decay of the teeth, or else displacements by pressure of mastication, the bridge being pushed down and the natural teeth forced aside.—*Dr. O'Duffy, Jour. Brit. Asso.*

**The Insertion of Dentures.**—I do not think the dentist is justified in allowing his patient to remain for even a period of three months after unfurnishing his mouth without furnishing it again; he loses to a great extent the original facial expression, and it takes a much longer time to become accustomed to the feel of the denture than if it were inserted as quickly after the extraction of the teeth as possible, setting aside the inconvenience and impairment to health through being deprived of his dental armature.—*H. Rose, Brit. Jour.*

**Iodin as a Cleansing Agent.**—I use iodin freely upon the crowns of temporary teeth as a cleansing agent; to remove the green deposits I give the prescription—

R	Tr. iodi, co.	-	-	-	-	-	3 i
	Glycerini	-	-	-	-	-	3 ii
	Ol. menth. pip., q. s. for flavoring.	M.					

This is to be painted upon the surfaces of the teeth by nurse or patient, and it does good service.—*Dr. Register, International.*

**Filling Frail Teeth.**—We should remember when dealing with frail teeth, having large cavities, that great masses of gold placed in contact with frail enamel walls must result in disaster from the mere effects of expansion caused by extremes of heat and cold. At one moment we drink ice water, bringing the temperature of the teeth and gold fillings down to thirty, and then we deluge the mouth with scalding hot tea, the result being a rapid and unequal rise of temperature, the gold responding and expanding to a greater degree than the enamel.—*Dr. Hill, Items.*

**Corrosive Action of Fruit Acids**—Some kinds of food have a direct local influence on the teeth, namely, fruits. Oranges, lemons, apples, grapes and berries contain besides sugar and flavoring material, an acid, which by long continued application is capable of dissolving out the lime salts of the teeth. Citric acid, which exists in large proportions in lemon and orange juices, seems to have the strongest corrosive action on the enamel of the teeth of any of the fruit acids. Tartaric acid or the acid found in grapes comes next in order.—*Odontographic Journal.*

**Mistakes.**—One of the great mistakes, I think, is the crowning of teeth that ought to be filled. I have seen this done too frequently. Another mistake that I have often witnessed, and I presume others have, is to attempt to disinfect a putrescent pulp canal in two hours. This is a mistake that is frequently made. I think it is a mistake to fill all pulp canals immediately. I have always thought so ever since I have been in the practice of dentistry, but there are men who differ with me, who think to the contrary, but that does not change my mind in the slightest degree.—*J. G. Reid, Review.*

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### New Publications.

**THE PRACTICE BUILDER.**—A TREATISE ON THE CONDUCT AND ENLARGEMENT OF A DENTAL PRACTICE. By Charles R. Hambly, D.D.S., author of the “American Dental Instructor,” “The British Dental Instructor,” etc., etc. Cincinnati and New York: American Dental Publishing Co., 1897. Price, cloth \$5.00; red calf leather, \$6.00.

This work fills a place in literature hitherto unsupplied. It is a manual of the business side of modern dentistry, treating of

everything that affects the professional reputation and financial success of the dentist.

The author in his preface says, "He has been impressed with the belief that a book devoted to the business side of dentistry would be of decided benefit to the members of the dental profession; not alone to the younger members and a large number who annually enter the ranks, but to many who have been in practice for years, but who have, by neglect or other causes, failed to advance the financial interests of their practices in accordance with their terms of service. All the statements made are founded on actual experience. The aim has been to make a practical book, a useful book, and to present answers to the problems which confront dentists every day." "The deductions made and observations propounded are the result of careful observation by practical men. The practical application of business factors toward professional success has been noted by men of thorough training, and it has been the attempt of the editors to present them clearly and exhaustively in order to unfold definite information upon the perplexing questions that present themselves to young and old alike."

In order to give the reader a better idea of the character of the contents of this book we quote the titles of some of the subjects treated :

The code of dental ethics ; Dental education ; Dental legislation ; Location ; Selection of outfit ; Furnishing the office : The elements of success ; The causes of failure ; The dentist himself ; Personal appearance ; Introduction to the public ; Partnerships, Associations, etc.; Mode of living ; Social diversion ; The church ; Marriage ; Banking ; The grades of material ; Grades of work ; The laboratory ; Operating room ; Children's teeth ; Gold work ; Plastics ; Plate work ; Crown and bridgework ; Esthetic operations ; The medicine chest ; Antiseptic dentistry ; Local anesthetics ; General anesthetics ; The dental journals ; The dental society ; Books ; Lady assistants ; The dentist's home ; His person ; Ideas ; Classifying information ; Purchasing ; Conduct at the chair ; Treatment of other dentists ; Paying bills ; Honesty ; Policy ; Tact ; Ambition ; Confidence ; Economy ; Accidents in the office ; Recreation ; Making money outside of dentistry ; Conservatism ; Patience ; Standing of work ; Influence and how to get it ; Reputation ; Wine and women ; How to become a

specialist ; Book-keeping ; Handling patients ; Points for special study ; Duty of young men to the profession ; Records ; Advertising ; Quotations ; Compensation ; The development of ability ; Post-graduate study ; Fakirs ; The use and abuse of credit ; How to get patronage ; How to hold patronage ; How to get new patrons ; Short sixes ; Pellets of gold ; Extracts, etc.

The book is an exhaustive one, containing 648 pages filled with useful information and advice that must be of value to everyone who heeds it. The paper, typography, press-work and binding are of a high order and the book will be a valuable addition to the dentist's library.

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**OVER THE HOOKAH: The Tales of a Talkative Doctor.** By G. Frank Lydston, M. D., Professor of Genito-Urinary Surgery in the Chicago College of Physicians and Surgeons ; Professor of Criminal Anthropology in the Kent College of Law, etc. Chicago: The Fred. Klein Pub. Co., 32 Market St. Price, cloth, gilt top, \$4.00 ; morocco, full gilt, \$5.00.

This is a collection of exceedingly interesting short stories, sketches and amusing anecdotes. The stories and conversation are addressed to a captivated medical student by one of his college professors, a general practitioner, Dr. Weymouth. "Most of the short stories embraced in the old doctor's talks with his student friend," says the author, "are entirely original and founded on real incidents, and should any of the character sketches, taken from life, appear overdrawn, the characters themselves should be held responsible—they were born that way."

The humorous and pathetic sketches, character studies, dialect stories, original verse and sentiment, are refreshing to the reader and beneath it all runs a vein of sound philosophy that will prove beneficial to everyone. In the 618 pages the following subjects are treated : Several kinds of doctors ; Apropos of several subjects ; How a versatile young doctor reported a society event ; The doctor emulates Sandow ; Seeing things ; The rhodomontade of a sociable skull ; A martyr to his passions ; "Old Abe" as a musical critic ; Poker Jim—gentleman ; Larry's contribution to the history of Ireland ; The passing of Major Merriwether ; Sprays of original verse, etc.

Dr. Lydston is well known throughout the literary world as

an entertaining writer and this work cannot fail to amuse the reader. It is just the kind of a book the dentist or physician needs to refresh himself after a hard day's work. The many illustrations show marked originality and some are very unique. The paper, press-work and binding are superb; the book is as handsome as it is interesting.

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A MANUAL OF PHOTO-ENGRAVING. By H. Jenkins. Chicago: The Inland Printer Co., Pub. Price, \$2.00 net.

Many dentists use the camera either for ordinary photography or micro-photographic work, but to obtain a half-tone engraving they are obliged to have the work done by an engraver. We have before us a manual containing practical instructions for producing photo-engraved plates in relief-line, and half-tone; with chapters on dry-plate development and half-tone color work, which should prove a valuable aid to those desiring to be guided rightly in learning the elementary and practical points of the half-tone process.

There has long been a demand for a manual of photo-engraving which would present its instructions in a concise form, without unnecessary detail and useless theorizing. This demand has been fully met by Mr. Jenkins' book, and all the instruction given is the result of practical work in regular engraving establishments.

Profuse examples show the varied forms of engraving, the illustrations being from photographs and drawings in line and wash by the well-known American artists—Holme, Traver, Shults, Cambensy, Gaspard, Leydendecker, Farny, Sloan, Wells, Richardson, Meteyard and Braunhold.

Mechanically the book is very attractive, being printed from new plates on highly enameled, heavy paper, with binding in light brown buckram, gold embossed.

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CATCHING'S COMPENDIUM OF PRACTICAL DENTISTRY FOR 1896. Atlanta: B. H. Catching, editor and publisher. 1897. Price, net \$3.00.

A yearly visitor of great value. The best of the practical

information given to the dental world during the past year is incorporated in the volume in a condensed and concise form. Aside from these articles, we notice many original contributions which add value to the work. The book contains 378 pages, eight departments, and 375 different articles. It is well indexed and an invaluable book; the practical ideas presented being applicable to everyday practice. No library is complete without it, and the possessor will find the book worth to him many times its cost.

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**PROCEEDINGS OF THE ACADEMY OF STOMATOLOGY OF PHILADELPHIA.**

Pub. by the S. S. White Co.

The proceedings of this society from its inception, May, 1894, to April, 1896, are incorporated in this book of 180 pages. The society has been doing good work and we hope its usefulness may continue.

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**SOCIETIES.**

**Michigan State Board of Dental Examiners.**

THE Michigan State Board of Dental Examiners will meet at Grand Rapids, May 10th, 1897.

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**Northern Ohio Dental Association.**

THE Thirty-Eighth Annual Meeting of the Northern Ohio Dental Association will be held at Put-in-Bay (Beebe House), June 15-16-17, 1897, commencing Tuesday, at 2 p. m.

Papers will be presented as follows: "The 'Matrix,'" Dr. E. B. Lodge, Cleveland. "Considerations Relating to the Loosening of the Teeth," Dr. Hugh Mitchell, Canton. "Compulsory Prophylaxis with Industrial Aspect," Dr. S. D. Stewart, Akron. "The Lower Third Molar," Dr. W. H. Todd, Columbus. "A Plea for the Dental Laboratory," Dr. Geo. H. Wilson, Cleveland. "Electro Therapeutics," Dr. W. A. Price, Cleveland. "Courtesy in Reference to Others' Failures," Dr. F. D. Davis, Minerva. "Root

Treatment by means of the Silver Salts and Cataphoresis," Dr. L. P. Bethel, Kent.

#### CLINICS.

"Gold and tin fillings," Dr. W. B. Conner, Akron.

"Crown-work," Dr. D. A. Allen, Toledo.

We hope to get a meeting of Delta Sigma Delta at the same time, which will insure additional interest.

There is good fishing at this time of year, you know. Come.

L. L. BARBER, *Cor. Sec'y.*

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#### Michigan Dental Association.

THE annual meeting of this society will be held at Battle Creek, Mich., June 8-9-10, 1897. A feature of the meeting will be a hygienic dinner to be given at the Sanitarium by Dr. J. H. Kellogg.

An interesting meeting is expected and all members of the profession are invited to attend.

H. C. RAYMOND, *Sec'y.*

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#### Dental Section American Medical Association.

THE annual meeting of this society will be held in Philadelphia, June 1-2-3-4, 1897. A cordial invitation is extended members of the profession.

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#### Commencements.

Ohio College of Dental Surgery, Cincinnati, held its 51st annual commencement, April 6, 1897. Matriculates, 212. Graduates, 50.

Chicago College of Dental Surgery held its 15th annual commencement April 1, '97. Graduates, 142.

Department of Dental Surgery, University of Maryland. Annual commencement was held March 31. Number of Matriculates, 210. Graduates, 62.

ANNOUNCEMENT.—The commencement of the Dental Department, Western Reserve University, Cleveland, will be held on Monday, May 17, instead of the 18th, as formerly announced.

# THE OHIO DENTAL JOURNAL.

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## CONTRIBUTIONS.

### New Methods in Prosthetic Dentistry.\*

BY DR. T. C. WEST, NATCHEZ, MISS.

IN the construction of a vulcanite denture, a more life-like appearance is obtained, and greater accuracy and greater strength secured, than by the old method of procedure, by the adoption of the following innovations:

(1). After securing an accurate plaster cast, coat it with rubber-cement (the "amber cement" supplied by the Chase Combination Dental Plate Co., is excellent for this purpose). Into the cement press closely onto the cast, with thumbs and fingers, black vulcanizable rubber, which will adhere to the cast. If there are any depressions on the alveolar ridge the black rubber should be thickened at those points to even up the surface.

(2). The next step is to vulcanize this—but only about three-fourths the usual time of vulcanizing a rubber plate. This forms what may be called *a base plate*, which is to be tried in the mouth and trimmed to accommodate the muscles. It will be found that this will fit the mouth better than the ordinary vulcanite plate, because it has been pressed closely on to the cast with the thumb and fingers, escaping the screw-pressure in closing the flask.

\* Presented at Mississippi Dental Association, April, 1897.

The editor and publishers are not responsible for the views of authors of papers published in the OHIO DENTAL JOURNAL, nor for any claims that may be made by them.

after packing, which is so apt to distort or obliterate the finer features of the cast. The rugæ are also nicely represented, the rubber over that portion being of uniform thickness.

(3). This vulcanized piece is now used as a base-plate in "taking the bite," which place in the articulator and carefully fill the palatal portion of the vulcanized base plate with plaster.

(4). The bite wax is removed when the plaster has hardened and the surface of the base-plate washed with chloroform, benzine or gasoline, the alveolar ridge portion coated with amber cement and covered with a sheet of red rubber—not extending it over the palate.

(5). The teeth are now warmed and pressed into the red rubber. It will be found that the rubber will bulge over the necks of the teeth, forming a very natural festoon, without any spatulating. (Teeth with a slight groove at the neck, such as are made for celluloid work, are the best for use in this method.)

(6). The next step is to place a strip of wax to cover the pins of the teeth, being careful not to melt it. In this condition the piece is tried in the mouth, and any desired changes in the position of the teeth made by removing the tooth, warming it, and resetting as desired, while the piece is in the mouth.

(7). Now a piece of modelling composition is used to fill the vault and form a support for the lingual faces of the teeth.

(8). When this is hard, the teeth are removed and a thin sheet of pink vulcanizable rubber is warmed and placed over the labial and buccal surfaces extending over and into the depressions from which the teeth were removed, each tooth being then warmed and returned to place, the sockets in the modelling composition showing the exact position of each tooth.

(9). Now coat the surface of the pink rubber with light tin-foil—it is not necessary to use heavy foil, as no screw pressure is to be used in this process.

(10). Next put the piece on the cast which was poured into the vulcanized base-plate (see 3) and place it in the shallow portion of the flask, building the plaster up so as to support the buccal and labial faces of the teeth.

(11). The modelling composition is now removed, as also the wax from the pins of the teeth, and for this purpose it may be necessary to use hot water.

(12). Coat the teeth about the pins with amber cement, and

put in red rubber, cut in small pieces, so as to anchor the teeth; coat with a layer of tinfoil, and—without either soaping or varnishing the plaster—fill the upper portion of the flask, put in the bolts, and vulcanize in the usual way, *regardless* of the partial vulcanization of the black rubber base-plate.

When the piece is removed from the flask it will be found that there is no excess of rubber and no filing or scraping to be done. It is only necessary to rub the surface with a stick wrapped with bibulous paper, dipped in a dish of pulverized pumice moistened with water, alcohol, or best of all with chloroform. This can, of course, be followed with chalk and a piece of chamois skin or flannel, and the rubber bleached by placing in a dish of alcohol in the sun. By this method there is saved the time usually spent in “waxing up;” the time spent in waiting for the plaster in the flask to harden in order to remove the wax; the time consumed in packing, heating up and screwing down the flask, and the time required to scrape and finish up the piece, also preserving the hard vulcanized surface-portion of the rubber.

#### METHOD OF MODELLING GUM FESTOONS.

Having vulcanized the base-plate as in (1) and (2) the teeth are waxed on as usual, but instead of carving up the gums, lay a strip of moldine over them close to the necks of the teeth. Punch holes in a semi-circular piece of very thin rubber dam and stretch this over the teeth, care having been taken not to have any wax between them. Now stretch the rubber dam back over the moldine, which by a little manipulation through the rubber forms the gums very nicely. Where necessary the rubber can be turned back and moldine added until proper contour is given.

The piece is now flasked with the rubber dam still covering the moldine. When the flask is opened and the wax washed out the rubber dam is removed, carrying the moldine with it. The piece is packed in the usual way. After vulcanizing, it will be found that the gums have a smooth surface of good form and that there is a happy absence of that dirty little piece of rubber down in between the teeth, which by the ordinary method gives so much trouble.

## Cross-Cuts.\*

BY JOSEPH T. DANFORTH, D.D.S., WARREN, PA.

AS THE matter to be set before you is a collection of ideas, rather than a treatise upon a particular subject, it naturally follows that the matter will be more or less disconnected. Many of the ideas have been culled from journals in days and years gone by, and put into service; to tell the author of them would be an impossibility, therefore, "I render unto Cæsar the things that are Cæsar's."

It seems to be the one ruling force of American genius in all professions to produce the desired result with a minimum amount of labor, time, and expense. That the dental profession is no exception to the rule is evident by multitudinous devices on the market to facilitate our labors, and it is not to be wondered at that, with so many conveniences at our command, we should be derelict in minor points of our labor. It is to these minor points that I desire to call your attention, not that you are unacquainted with them, but rather that due consideration has not been given them, or that in the rush of duties they have been overlooked. First, a short consideration of operative work, with some of the daily obstacles and annoyances that have to be met and conquered.

## CERVICAL EDGES.

Why is it that they are not as perfect as the labial or buccal edges of our cavities? Simply because we do not make them so, and we do not make them so because we do not have the room to properly prepare or fill that portion of the cavity. The cervical edge cannot be properly prepared when it is in contact with an adjacent tooth, neither can the contour be restored when such a condition exists. I refer to the approximal contour, for, as you all know, to prevent decay the filling should keep the cervical margin from contact with the adjacent tooth. Too often this edge is sacrificed with the ribbon saw in order to obtain an edge that will not catch the floss, while the contour and actual condition of the edge, are not given due consideration. Take for instance a common case, where the young patient presents herself

\* Read before the Lake Erie Dental Association, May, 1897.

with approximal incisor cavities extending to the gum or beneath it, tooth structure poor, nerve tensure high, gold is out of the question. Half a dozen such cavities are excavated until they are more or less cleaned, according to the disposition of the patient and operator, then two adjacent ones are quite likely to be filled with the same insertion of cement, with no thought of using a matrix for they can be separated at the next sitting by using the ribbon saw. The result is, that when the saw is used, or worse still, where no separation is afterwards attempted, that in order to get the saw between the teeth so as to reach the cervical edge, the teeth are forced apart just the width of the saw, and since the cement in the two cavities is combined in the one solid mass, it necessarily follows that something must give sooner or later, and we discover (as we put it to our patient) that one of the fillings for some unaccountable reason, is loose. To be concise, we have deliberately forced it from the wall of the cavity.

#### SEPARATION.

As to the mode of separation, I leave that with you. Cotton put in snugly, with a light varnish over it, has given me satisfaction in a large majority of cases. In very small approximal cavities, where you do not wish to sacrifice tooth-structure to reach it, I sometimes use rubber, removing this probably the next day, and insert a little gutta-percha, which is allowed to remain a day or so when the soreness, caused by the rubber, will have disappeared.

#### DRYNESS.

If we were as careful to keep the cavity as dry in alloy and cement fillings, as we are in gold work, much the better results would be. Too often the reason that we do not do so is because we do not wish to take the trouble of placing the dam. Many of us have worked on the principle that wherever the dam could be conveniently placed, that was the proper procedure, but that is open to question. At least in the last few years I have found in a large per cent of alloy and cement work that the dam was not necessary. With the superior teeth, the napkin placed in the mouth, with one corner turned, and the cotton roll cut to size on the gum under the cheek or lip, keeps the tooth dry, reflects the light, catches any droppings of the fillings, and is

easily held in place with the mirror. The cotton roll works in to advantage in the lower jaw also. Sometimes by cutting two pieces about an inch long and folding them into the corner of the napkin, leaving the ends about three-fourths of an inch apart, I have found it much easier to keep the rolls where they are wanted; and the great absorbing power of the cotton rolls, makes them a strong adjunct to the napkin in the inferior mouth. But with the inferior molar buccal cavities, where the dam is not practical, and the patient possesses one of those copious, inexhaustible supplies of saliva, and after thirty second's work, you find that the levee can no longer hold back the mighty flood, and the region is speedily inundated, what is to be done? Many such cases may be filled without the aid of even a napkin, by giving the patient 1-100 of a grain of sulphate of atropin about an hour before the operation. This is easily prepared by dissolving one grain of sulphate of atropin in 200 drops of water; then it is always ready for use, and by having some vials on hand all that is necessary is to place a little water in the vial, take your dropper and add two drops of the solution and direct the patient when to take it.

#### RUBBER MATRIX.

In regard to the filling of the incisors with cement, where there are two adjacent cavities, and it is desirable to fill them with one mixing of the cement, a neat matrix may be found in a narrow ribbon of rubber dam drawn taut over the adjacent tooth until the cavity is filled, and then reverse over the new filling until the second cavity is filled. After the fillings are sufficiently hard, the strip, with a little tension while cutting, may be trimmed quite close and what remains will act as a separator, so that at the next sitting there will be no trouble in properly finishing the filling. It might be added that the patient can very often hold the strip in place.

#### A MEDICINE HOLDER.

A very handy little article in a dental office is the old-fashioned round salt-cellar, a little over an inch in diameter. This will be found an excellent article to hold polishing powders or small medicinal solutions, and by inverting it, drops of medicine are easily retained.

## ACID APPLIER.

The small Japanese wood tooth-pick, with a little cotton wrapped on the end will be found of great value in the application of some of the acids and oxidizing agents. Re-dipping the tooth-pick into the salt-cellar, instead of a bottle, will be a much more pleasing sight to the patient for various reasons.

## CUPPING.

In the treatment of abscesses we oftentimes have a patient complain of the pain which follows the injection of the oxidizing agent. This may be greatly relieved if a new rubber cup, such as we use for polishing fillings, is used as an exhaust pump prior to the injection.

## HOW TO INSERT ROOT CANAL DRESSINGS.

Sometimes we feel uncertain whether the cotton which we had previously dipped into some medicine has been successfully placed in the pulp canal, because, having lost its stiffness by becoming damp, it seems to pack in a lump in the pulp chamber. This may be easily overcome by making the cavity reasonably dry, forcing a hard dry twist of tapering cotton up the canal and then apply the medicine to this by a pellet of cotton—capillary attraction will do the rest. It may be desirable afterwards to place cotton over this, but the latter cotton should not absorb the medicine placed on the first. This may be overcome by placing between the two a small piece or rubber dam, cut to size, with or without a little varnish to hold it in place. If this is placed carefully, there will be no disagreeable taste in the mouth in the use of coal tar and other disagreeable preparations.

## THE LABORATORY.

All spend more or less time in the laboratory with a greater or less degree of pleasure in it, according to circumstances. For those circumstances I think we are often to a small extent at least, responsible. Do we not look upon it as a place of drudgery simply because it is dirty work? Well, doesn't the young house-wife go at her first flower-bed as if she had her heart in it? She wants to see the fruits of her labors, and if she does not get in contact with genuine *terra firma*, who does? And all of the time the beautiful is constantly before her eye, although in the

future. We can work likewise if we will use a few moments each evening to clean up, keep things in their place, and try and make our laboratories attractive.

#### TO REMOVE TEETH FROM RUBBER PLATES.

It sometimes falls to our lot to remove teeth from an old rubber base. We proceed to hold the plate over a gas jet until the teeth can be pried off, and in doing so we seem to forget that the odoriferous waves of  $H_2S$ ,  $S O_2$ , and other things have found their way to the remotest corner of our office and possibly to a neighbor's. This might be overcome if we would boil the plate for a few moments, when the rubber will be found yielding, and by grasping it with the pliers the rubber may be sprung from the teeth and a few repetitions will complete matters.

#### REPAIRING.

In repair cases the new rubber will take a better hold if the surface is rough, and I know of nothing that roughens it to better advantage than the cross-cut fissure bur.

#### AIR CHAMBERS.

Some still use air chambers and it may be that there have been cases when, in the endeavor to get a thin plate, the discovery is made too late that not enough room was left over the air chamber. To guard against this, after fitting the chamber to the cast, but before it is pinned down, place a roll of soft wax over the air chamber and close the flask snugly. Remove, and the wax will show the thickness of the rubber over the air chamber.

#### TO STIFFEN TRIAL PLATES.

In cases of the inferior molars and bicuspids to be supplied, a wire bent to shape and waxed to the trial-plate will save the annoyance of having the patient double it up for us.

#### A SUBSTITUTE FOR ARTICULATING PAPER.

In correction of an articulation you may some day be caught without articulating paper, and to facilitate matters take a little thin paper, wet your finger with a little alcohol or water and rub on a little polishing rouge. This dries quickly and takes but a few moment's time to prepare it. No matter how many flasks

one may have there is no need of putting an extra one that does not contain a denture in the vulcanizer each time. Many desire to have the flask in the upper portion of the vulcanizer. Take an iron block or thick tubing just the height of the flask for the purpose ; then you have an extra flask that may be called into service while you are vulcanizing.

#### TO PROTECT THE EDGES OF INSTRUMENTS IN STERILIZING.

To save the edge of the excavator when sterilizing by means of a hot water bath, fit a piece of belting rubber to the false bottom of the bath.

#### USES OF ASBESTOS LINING.

One of the things in the laboratory that will be found to be a great saver of time is John's asbestos stove lining, which may be found in small pails at any hardware store. It is plastic and will be found of great value for quick investments in crown and bridge work, holding regulating appliances while soldering, always ready, quickly moulded to shape, and no waiting for it to set. I have used it in repair work with porcelain facings, of course applying the heat gradually, without a sign of a fracture.

#### RESTING THE PATIENT.

To leave the laboratory, let us take a retrospective view of the operating room. It is well to keep in mind that it is to our interest to do all that we can to make our patients at ease, and one thing that oftentimes gives the patient eomfort is the placing of a small pillow at the small of the back, or the change of the position of the head by placing the pillow on the head rest. Make it a point in long operations to stop for a few moments to prepare some more gold, or fake some excuse, if necessary, and invite the patient to get up and move around the room ; in the meantime you can take a seat and have a little rest while preparing the gold. Too much trouble! Try it and see if it does not pay you the next time you have a long operation.

#### GOOD HUMOR.

To keep the patient in good humor we should be careful to see that we are so ourselves, for we all know there is a liability to sympathetic action in the patient if we are out of tune. Diversi-  
sion of the patient should not be forgotten, for oftentimes an

otherwise restless patient may be kept in a quiet condition by a few well chosen anecdotes. I do not mean by that to stop work and tell stories, just splice them in with the work so that the patient cannot tell when one operation begins or another ends. Don't be afraid to have a rug to stand on at the chair, and let the patient know you stand on that rug and sit on your operating stool because it makes it easier for you. A common sense person will not commend us in needlessly exhausting our vitality.

#### WASTE-BASKET.

A waste-basket at the chair is an absolute requirement for a clean office. I found a conical-shaped, flat-backed basket about ten inches high by four wide that hangs nicely at the back of my chair at the left. The inside is lined with light weight oil-cloth on a wire frame that can be quickly removed and washed.

#### DIAGRAM BLANKS AND RECORDS.

To have a good memory is a fine thing, but as in other things it can be abused and I see no need of taxing it with matter that can just as well and in fact far better be kept on paper. I refer to diagram memorandum blanks. The little examination pads S. S. W.'s No. 1 are quite convenient to indicate cavities to be filled. I use a lead pencil, making a good sized dot to indicate the cavity and making a dash from it towards the edge of the paper, and so on around until every cavity in the mouth is indicated thus. I might add that this is not done until the teeth are cleaned. Then, as a cavity is prepared, I draw a small oblique line across the dash extending from the cavity on the diagram and so on until the number of cavities to be excavated at that sitting is completed. If that completes operations for the day the diagram is laid aside; if one or more cavities are filled a second line is drawn across the first, making an "X" out of the two. Sometimes Al. or G. (whichever the filling may be) is placed at the end of the dash. No matter whether the patient returns in two days or two months the diagram tells at a glance what has been done and what remains to be done. This proves a help in making the entry in the day-book, as the entry may be deferred until the close of the day if desired, and at my leisure the record is transferred to Dr. Allen's examination booklet. This is indexed and used in conjunction with an ordinary mercan-

tile ledger, the two being independent of each other, and yet each explanatory of the other. To enumerate the many points of value of such a diagram system would be useless. You may recall the case of a man who was drowned while bathing a number of years ago, and the insurance company failed to identify the body which was not found until many weeks afterwards. The deceased's dentist was wired for, came on, and by means of his chart was able to tally up every filling in the man's mouth. The relatives obtained thousands from that diagram, but I don't know what the dentist received. But if there is not thousands in it for us, gentlemen, we may be able to get compensation for doing over some other man's work when otherwise the patient would insist that it was ours.

#### DISCUSSION.

DR. H. E. DUNN said patients take a great deal of interest in record charts, especially if the dentist explains how the record may prove of value other than merely as a memoranda for the dentist.

He has found that a piece of piano wire, well sharpened, makes an excellent gold carrier.

DR. J. N. WHITESIDES thinks one of the greatest mistakes the dentist can make is in not getting fair recompense for dental work.

He thinks it bad practice to fill approximal cavities with cement, for in this location it will not stand.

DR. A. M. ALLEN said he had had success in excavating tooth-pulps, by taking a hypodermic syringe, placing gutta-percha around the needle, then pressing the gutta-percha over the cavity, with syringe-needle in position, and injecting a local anesthetic into the pulp, then open and remove the nerve.

DR. L. P. BETHEL spoke of the use of the wire brush-wheel, made for jewelers, for cutting down and polishing crown and bridge pieces and other metal work. It cuts rapidly and is a time saver. The wheels can be procured at any jewelers' supply house.

**Amalgam in Combination with Cement.\***

BY J. D. WHITEMAN, D.D.S., MERCER, PA.

Of all the methods that have been advocated for the manipulation of amalgam, the most valuable one of all seems to have been almost entirely overlooked by the whole profession, although introduced years ago and used constantly by men eminently successful in the use of this material. I refer to the use of amalgam and cement in combination.

Probably the most prominent objections raised against amalgam fillings are, shrinkage, lack of edge strength and discoloration of both filling and teeth. Now, if this material is used in the ordinary way, that is, packed directly against the walls of cavity or even against varished walls, all these objections are always seen to a certain extent. For this reason all cavities before being filled with amalgam, should be first lined with cement, and the amalgam added and forced into the cement while it is still very soft, in order that a union may be accomplished between the two materials. Very often a cavity may be two-thirds filled with cement, and in that case the filling is only veneered with amalgam, and as one would conclude from Dr. Black's experiments, the amount of shrinkage increases and decreases in proportion to the size of the mass of amalgam. That is only my conclusion, however, but I believe it is only reasonable to presume that it has an influence in reducing the shrinkage. Besides this, the filling will have permanent adhesion to the walls of the cavity, which is the greatest possible assurance against leakage. The discoloration of the teeth, resulting from fillings of amalgam alone, is entirely overcome. The cement forming the bulk of the filling, the amalgam coming in contact with the tooth only at the margins, and there only to the depth of the enamel. This feature removes entirely the objection to filling the posterior surfaces of canine teeth, the anterior as well as the posterior surfaces of the bicuspids, and makes it practical to fill even incisor teeth when they are dead and broken down so badly that to fill them with an all-gold filling would require more malleting than they would bear with any degree of certainty. Such a tooth may be restored,

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\*Paper read at the Lake Erie Dental Society, May, 1897.

perhaps, to the extent of four-fifths of the entire filling required with cement and amalgam; the labial portion and the cutting edge, if it be involved, built up with gold, at a subsequent sitting. The operation is less severe on the tooth than if the filling were all of gold, and if properly done, the appearance is not affected in the least; and by virtue of the large amount of cement used, the tooth is materially strengthened.

By using this valuable combination of materials in a similar manner, the molar teeth may be restored that are so badly broken down, that it would be almost, if not quite impossible, to secure sufficient under-cut to retain a filling of amalgam alone.

To build up a badly broken down molar tooth it is usually necessary to apply the rubber dam. All frail walls are first cut down sufficiently to enable one to over-build with amalgam and obtain the thickness of that material over them, to secure the required edge-strength. A dove-tail is made in the pulp chamber, which is generally all the provision for anchorage required. Perfect dryness being of course obtained, thin cement is smeared all over the surface of the dentine and the dove-tail in the pulp chamber nearly filled; a large block of amalgam is now forced into the cement in the dove-tail, small and rather long pieces, about like a grain of wheat, near the margins, and are burnished down to them, forcing out the excess of cement. The cement now having become stiff, take an excavator and expose all the margins to make sure that there will be no cement there when filling is completed. A suitable band matrix is now adjusted, and a small piece of amalgam packed carefully but firmly against the margins. Complete the filling with a new mix of amalgam preferably of a white alloy, wafered hard with pliers. Pack with the automatic plugger, using a large straight point, about the size of a No. 7 bur. The removal of the excess of mercury is facilitated if, after every few pieces of amalgam are packed, a ball of bibulous paper is placed over the filling and struck several hard blows. This will also very much solidify the filling, and one packed in this manner, will admit of the cusps being nicely carved up and the whole filling finished, so as to present a very artistic appearance, even though it be of amalgam.

Circumstances often prevent the filling of the bicuspids and often the cavities in the posterior surface of the cuspids with gold.

It is a very easy matter, indeed, to fill any cavity in these teeth with cement and amalgam combined in this way, and produce a very esthetic result. The dentist who neglects to do it, but packs the amalgam directly against the walls of the cavity thereby discoloring the tooth and often fairly blackening it, certainly fails to do his whole duty.

The advantages that may be reasonably claimed for a filling inserted in this manner over one of amalgam alone are worthy of repetition.

*First.*—Adhesion to the walls of cavity.

*Second.*—The discoloration of the teeth is entirely overcome.

*Third.*—It hermetically seals the tubuli of the dentine.

*Fourth.*—It strengthens the tooth, especially the walls of cavity.

*Fifth.*—It lessens the susceptibility to thermal changes.

*Sixth.*—It makes a filling more compatible with tooth structure.

*Seventh.*—It avoids the necessity of weakening walls of cavity with heavy undercuts.

These, I think, fully warrant the assertion of Dr. Driscol, of Florida, "That the time will soon come when it will be considered malpractice to insert any amalgam filling without cement under it."

#### DISCUSSION.

DR. H. E. DUNN said he had used the process successfully for about eight years. He considers a body of cement necessary and believes that by the method a great many teeth can be saved that would otherwise be relegated to the crowning process.

DR. G. H. MORGAN had tried this method of lining cavities because theoretically it presented possibilities that would bring about great results; but in practice he had found it quite difficult.

DR. A. C. McALPIN advised those who had not been using this process to practice it, and when they have acquired the ability, use it and they will be abundantly satisfied and benefited.

DR. W. B. TOWNSEND allows the amalgam to partially set before pressing into the cement and thinks it acts well, especially where the cavity has weak walls.

DR. GEO. ELLIOTT said the little practical points should be watched in order to insure success. One might have failure from

lack of dryness, etc. In making a filling of this kind place cement in the cavity, press a little amalgam into it and wait until the mass hardens, then complete the filling with amalgam and success will attend your efforts.

DR. C. D. ELLIOTT said they used to consider discoloration of amalgam beneficial; now the papers say it is different. We used to think an amalgam that did not discolor was not good. He uses combination fillings and likes them, especially for large cavities with weak walls.

DR. J. H. HEIVELY has had no failures that he knows of in the use of this combination.

DR. J. A. TODD said the key-note of it all is to get the material right and placed right then the results will be right. The method is a good one if rightly employed.

DR. J. D. WHITEMAN said that he was removing, almost daily, amalgam from bicuspids and lining the cavities to prevent discoloration of the teeth. He uses black amalgam only at gum margins. Black alloy, veneered with light alloy, makes a nice filling.

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### An Incisor or Cuspid Crown.

BY W. H. BROWN, NASHVILLE, TENN.

THE only way I can make an open-face crown for cuspid or incisor, that will fit perfectly, is as follows: Take, for instance, a central incisor on the right side, the left lateral and cuspid is out, and you want to make an open-face crown for the central. First, get your strip of gold a little wider than the tooth is long, and a little longer than will go around the tooth. Bring it around the tooth and with a pair of flat pliars pinch and draw tightly around it until it fits perfectly. Hold it tight and with another pair of pliars, of the same kind, draw or pinch the gold down at the point of the tooth. Stick a pin through the edges, remove and solder together. Trim edges and cut out the face in the usual way. You will find that it fits perfectly and will not take five minutes to make the crown in this way. If the tooth is broken off at one corner build it up with cement.

## Treatment of Riggs' Disease.\*

BY HOWARD T. STEWART, D.D.S., GREENVILLE, MISS.

\* \* \* \* \* Whatever the causes—whether local or systemic; whether associated with either salivary or serumal calculus or with none; whether with pockets deep and easily penetrated, or with the gums firmly adherent to the tooth; whether pus be noticeable or not; whether the teeth are loose or firm—the treatment is virtually the same, viz.: a thorough breaking up of the diseased tissues (and removal of deposits if present) stimulating and solvent applications; protecting the pockets (if present) from the injuries of micro-organisms until nature has a chance to establish a healthy condition. Success depends, not so much on the special mode of treatment adopted, as on the thoroughness and skill with which that treatment is applied.

The first thing is to obtain the consent and co-operation of the patient. Suppose a case in which several teeth are seriously affected, calculus abundantly present, the gums highly inflamed and bleeding at every tooth, and with very offensive breath. *First.* Lower the window, open the door, and give the patient a refreshing glass of a pretty healthy solution of permanganate of potash. Then remove all visible calculus and dismiss the patient for several days with this prescription:

R. Acidi tannici, . . . . . 3 ij.  
Acidi carbolici, . . . . . gtt xxx.  
Glycerinae, . . . . . 3 j.  
Aquaæ q. s., . . . . . 3 viij.

M. Sig. mouth-wash three times daily.

This gets things in shape to begin work in good earnest at the next sitting. I have no confidence in any but the most heroic treatment. The first step is to inject, with hypodermic syringe, a small quantity of a 1% sol. cocaine (or eucain which I prefer). Next, insert a suitable scraper (I have but little use for a scaler) under the gum, and scrape the cementum thoroughly—only within the pocket to avoid bleeding. Next comes what I consider the most important part of the treatment, which is essentially different from the usual methods.

\*Paper read before the Mississippi Dental Association, April, 1897.

A thin, flexible, chisel-shaped lancet—three-edged, cutting in point and sides, is deftly carried toward the apex, to a considerable depth beyond the bottom of the pocket, and holding it firmly against the side of the root, carry it all the way around the tooth, separating the gum entirely from the tooth. If no pocket is discernable use the lancet just as freely. This operation, under the effect of the cocaine or eucain injection, is absolutely painless and gives free access to the root which we proceed to scrape and chisel heroically all around, especially about the part exposed by the pocket. This should be done, not merely sufficiently to remove the tartar, but so as to completely tear away the thickened and congested membrane. A speedy and permanent cure is impossible unless this is thoroughly done. The overlying gum is also to be thoroughly lacerated, tearing away the tough glazed inner surface in order to induce new granulations and a reunion with the tooth. During this operation the territory should be repeatedly and forcibly syringed out with hot water in which a few crystals of permanganate have been dropped, with sufficient force to throw out debris. Two teeth are usually enough to operate upon at one sitting, which will require from one to two hour's time. Having completed this part of the operation, inject into the pockets, with a Dunn's syringe, a solution of permanganate of potash (20 grains to the ounce of water) followed by a 50% solution of the commercial sulfuric acid introduced on a quill, or orangewood. This strong solution is used for its solvent action on the cementum itself. The enamel must be carefully protected from the overflow. In some cases it may be best to use a 20% solution, with a Dunn's syringe, followed by the stronger solution as above. Next protect the pockets from saliva and flow over them the following (the formula of Dr. E. C. Kirk):

Shellac,	3 ix.
Benzoin,	3 iiss.
Balsam tolu,	3 iiss.
Carbolic acid,	3 iij.
Oil cinnamon,	3 iss.
Saccharin,	3 iss.
Alcohol q. s.,	Oij.

Having applied the above with chip blower or hot air syringe evaporate the alcohol, leaving a covering that will protect the pockets for several days. Instruct patient not to use tooth-pick

or brush upon the surfaces thus protected and dismiss with this prescription :

Sig. Rinse mouth every two hours.

On the constant use of this wash depends largely the success of the treatment. It must be continued for weeks, sometimes months.

The tannic acid wash prescribed at the first treatment is also to be continued three times daily. 1st. To relieve inflammation; 2d. To cauterize the loosened gum and hold it tightly against the tooth until reunion takes place.

If preferred hydronaphthol, Listerine or Pasteurine may be substituted for the permanganate wash ; the latter, though old-fashioned, is still good.

The prescription of the washes completes the treatment; there is no secondary treatment at the chair, the constant, continued use of these washes being all that is now necessary. At the end of a month examine the teeth and if any one of them is not doing well repeat the treatment for that particular tooth, scraping, or even burring away with the engine the outer surface of the cementum, treating and protecting as before.

In very stubborn cases it may become necessary to devitalize the pulp, remove and ream out the canal, treating from the inside as well as on the outside. Should this be found necessary ream out the canal freely, and with a very small drill (made by grinding the shank of a broken Gates-Glidden drill to a chisel shape) go through the apex. With graduated Gates-Glidden drills secure a free opening through the root until the tissues bleed freely; then syringe out forcibly with the hot permanganate, pump in a 25% solution sulfuric acid, forcing it out through the apex and around the root as much as possible, reaching the affected portions of the alveolar process itself. Then carry loosely into the canal a strand of cotton saturated with a 10% solution of the sulfuric acid. Seal up with temporary filling for twenty-four hours. Repeat for several days until the root has become somewhat tough and springy. Fill the root. Nature will do the rest. If, as Dr. Clement has clearly shown, the canaliculi of these teeth are partially obstructed by the deposition of lime salts, thus destroying the vital relation between pericementum and cementum,

tum, may it not be that the acid employed, has some solvent effect on the lime salts, penetrating and stimulating to renewed activity the sluggish vitality in the tissues? And even when the cementum has been removed at some points by the above surgical operation, may not the acid, by its solvent effect in the tubuli of the dentine serve to induce some vital connection between the dentine and gum tissue? Certain it is that there is sometimes established a connective tissue that is quite firm in its attachment.

When all else fails, the tooth may have to be extracted, operated on outside of the mouth and replaced, but this will seldom have to be resorted to. Gold bands cemented to the teeth—the affected tooth and the adjoining teeth—separate bands for each tooth, joined by solder between them, are preferable to ligatures for securing loose or replanted teeth in position. Molars and bicuspids may be made comparatively steady by placing a connecting bar in the grinding surfaces, in a groove deep enough to allow the bar to lie well out of the way of the opposing teeth.

Failure in the treatment of this disease is most frequently due to lack of thoroughness in the surgical operation; a lack of courage to cut and scrape thoroughly. Too much stress cannot be laid on the importance of the work, the only precaution necessary being not to leave such furrows and grooves as might irritate the overlying gum. The scrapers used should be stiff enough to allow of being used with considerable force, and should cut like excavators. In the words of Dr. Lawrence: "If your surgical work is not perfectly done, I do not care what your indication is, you may treat till doomsday and you will not get the desired result."

In regard to fees the charge should be according to the time that it consumed and should correspond to the greatest amount one is able to make in the same length of time by other operations in the mouth.

## Dental Therapeutics.\*

BY J. W. VAN DOORN, D.D.S., CLEVELAND, O.

THE subject chosen is rather too comprehensive for the style of the paper, and to properly limit it, I wish to offer a few preliminary words.

At the first reading or hearing of the words "Dental Therapeutics," I would like to ask each one of you, honestly to ask yourself if the teeth, gums and local applications thereto were not the first, perhaps even the entire thought and aspect of the subject which immediately came into your mind? The answer I assume to be "yes;" and that answer, that almost inevitable answer, in any gathering such as this, must be the excuse for my shifting thoughts finally settling upon this subject. For I have a conviction that "dental therapeutics" should mean a great deal more, that in fact it does mean vastly more than this.

Without usurping the functions of a medical practitioner in the least, with no desire or intention of undertaking the care of the sick, still *nolens volens*, we are compelled to recognize conditions wherein the teeth, as our especial care, are only to be made comfortable and returned to a normal condition by other than local treatment.

Pardon me, if before I go on to speak of systemic treatment for especial cases, if I still further premise that I am as far as ever from the idea of drug-dosing. I would neither advocate nor adopt in my own practice, the indiscriminate use of drugs with the ordinary patient who presents himself for treatment in a dental office. Nor is it my wish that any should ever so faintly gain the impression, from what has been or may be said, that I propose any system of "molly-coddling" in the way of general or systemic opiates or narcotics preliminary to an operation.

But there are a few conditions which warrant the assumption on our part, that the teeth, when troublesome and uncomfortable, are so not only because of local lesions, but because of an allied bad condition of the nervous system; of the secretory or excretory organs; of the digestive apparatus; or even because of an

\* Read before Cleveland Dental Society, December 7th, 1896.

expansion of organic function within perfectly normal and physiological limits.

Now, these conditions, here vaguely alluded to, are not generally speaking, of so pronounced or serious a character, as that a physician should be called. In the great majority of such cases as I have in mind, the patient is conscious of no difficulty except with the teeth. The pain is there. He or she goes about his or her daily avocation. He is not hindered from doing whatever it may be necessary or customary for him to do, save by the presence of pain in the teeth. You examine the teeth of such a patient, finding possibly some work to be done. Shall you also send him to a physician: I am speaking now of a patient whom by questioning or by proffered information, you have determined to be in a nervous, worn-out, anæmic, or malaro-neuralgic condition, aside from the mere local mal-condition of the teeth. Conscious of no pain or difficulty, save in his teeth, the chances are that, recommended to visit a physician, he will simply ignore the recommendation. And yet clearly, something ought to be done for him. Perhaps even your examination of the teeth of such a person will reveal no carious teeth present; but the teeth ache. Will you send him to a physician to stop his toothache?

Or what will you do with such cases as continue to present evidences of pain, after all that can be done locally has been done by you? Did you never have such a case as this?

Gradually, too gradually, I am now inclined to believe, it has forced itself upon me personally, that I have not done my full duty in the class of cases later to be cited, when I have sent them away, having simply made the fillings which the teeth required. Looking at it from the present standpoint, it has been an evasion of responsibility, and a responsibility which reasonably we might be required to assume.

As a defense, we might offer that the teeth being made right, the other conditions, sooner or later, would correct themselves anyway; that some patients, perhaps many, would not only ignore, but even resent, such counsel from a dentist as would ordinarily only be procured from a physician. So they may, but you will have attempted to perform your whole duty, and experience leads me to believe that the number of those who ignore or resent your advice will grow rapidly and happily less.

Having now, in a general way I trust, made clear the trend

of this paper, and equally I trust avoided the imputation of setting up for a general practitioner of medicine, let me, if I can, present a number of the conditions which would seem to warrant such a plan of action on our part as has been proposed, and also a few simple remedies to be used in those conditions.

I think I cannot do better than to repeat the classification of those conditions, offered by Dr. L. Ashley Faught, in the *Cosmos*, for December, 1894. It is as follows:

1st. All the manifold conditions of the nervous system, as related to the usual operations at the chair, connected with restoration of lost tooth-tissue.

2nd. Dentition.

3rd. Treatment of acute abscess.

4th. Treatment of exposed pulps and neuralgic states.

5th. Prophylactic conservation of tooth-tissue.

6th. Pyorrhea alveolaris.

For coping with the first condition, so far as the pain is concerned, cataphoresis now affords us an easy and practical way of taking care of the nervous system during operations.

For the fatigue of work of any duration, the average patient needs little fortification. I have given in some few instances, alcoholic stimulants, in the shape of port wine, brandy, and whiskey. This should be done advisedly, due regard for all the circumstances being taken. In the few cases where I have felt it necessary to give these stimulants, I am satisfied that the results justified the action.

But suppose a manifestly nervous patient comes to you, I do not mean by nervous patient, in this instance, so much the patient who possesses a nervous temperament as his inheritance, but the man who comes into your office with the remark: "Doctor, I've been working very hard of late, I'm all tired out, and my teeth have commenced to hurt me;" or, "Doctor, I've been losing my rest at night, lately, from one cause and another and my teeth are paining me some;" or, "I've been on a good deal of a strain for some time past, doctor, and I find my teeth beginning to bother me."

Now, we know that when the nervous system is more than ordinarily active or is overtaxed for any length of time, the fluids of the mouth will show a more than ordinary acid reaction, and we argue from this that a restoration of nerve-poise or nerve-

balance, will mean a corresponding restoration of tooth comfort, both from a betterment of surrounding conditions and a betterment of the nerves themselves. Now, in a case like this there may be lesions of the teeth or there may be none. The teeth primarily are not the cause of distress.

Now, suppose you cannot work for such a patient right away, but have to make an appointment for him two or three weeks in advance, are you doing all you can for him when you put his name down on your book and dismiss him? Again, I ask, will you send him to a physician, to get his toothache cured? That would establish a bad precedent.

Would it not be well to ask him, for example, if he now found himself in a position to take the rest which he needed. If he answers in the affirmative, prescribe it and along with it an hour or more of exercise in the open air every day. Possibly the work, the late nights and the strain must still go on. Manifestly then something more must be done.

To secure his sleeping and resting well at night I would prescribe—

Bx. Elix. chloral hydratis - - - - - ʒj.

Fiat ut coch. parv. grana duodecim contineat.

Sig. A teaspoonful in a little water to induce sleep. Dose may be repeated once if necessary.

This gives a dose of twelve grains, secures a calm restful repose, with no after effects of the drug. Sleep is Nature's soft nurse, her balmy restorer in very fact as well as poetry. Now, he wants next a good tonic. As a first step, inquire as to the condition of the bowel.

If constipated habitually, recommend a teaspoonful of syrup of cascara sagrada, daily at bed time. Precede this, if advisable, for immediate relief, by a warm saponaceous injection. The sagrada is a tonic laxative, with no griping or unpleasantness. Other more active cathartics may seem to be indicated. Where there seems to be febrile disturbance, Rochelle salts, Epsom or Glauber's salts may seem preferable. Castor-oil, in capsules, not difficult to take and tasteless, might seem advisable. A glass of Hunyadi or Apenta water, half-an-hour before breakfast, perhaps would meet the taste of the patient better.

Now, in tonics, we have a wide range. A sixtieth of a grain of strychnine after each meal, for a week or less, admirably im-

proves all the vital functions, particularly the circulation and the assimilation.

Ten minim doses of Liquor Potassii Arsenitis (Fowler's Solution), decreasing the dose daily by one or two minimis, after meals, for a week or less. This last should, of course, not be given where any gastric irritability exists. Neither should very young children be given this solution.

At the same time you start your patient on the tonics, induce him to increase the amount of water he is drinking. For tissue-change and its functions are dependent upon the presence of water in sufficient quantity. This is partly supplied by the water in our food and partly by the water which we drink. Temporary excess of supply leads to increased activity of the excretory organs and augments metabolism. Where the increased ingestion of water continues for several days, the volume of the blood is increased and there is an increased removal of waste products from the tissues. It is to all intents and purposes, a washing out of the blood, tissues and excretory organs, particularly of the kidneys. Now, by reason of the removal of the waste products, the organism is in condition to take up a larger quantity of nutritive material. So that, provided the water drinking be not carried to such an excess as to disturb digestion, it causes increase of bodily weight; and the urine, saliva, bile, pancreatic and intestinal juices, and the perspiration are increased.

If you have the confidence in Fellow's Syr. of Hypophosphites Comp., which personal experience and observation have given me, prescribe that—a teaspoonful before, during or after meals.

A new tonic, of which I personally known nothing, but the formula of which is admirable, is Gray's Glycerine Tonic Comp. Most of you have probably seen samples of it within a few days. Were the paper not likely to grow already to a tedious length, it would be worth while to dwell on some of its constituents.

Phosphoric acid dil.	-	-	-	-	-	-	3 j.
Syr. zingiberis ad.	-	-	-	-	-	-	3 viii.
M.							

Sig. Teaspoonful at meal times, is another tonic for debilitated nerves, which is well adapted to some cases.

Now, supposing, instead of being nervous or run down by worry or work, your patient is anæmic instead. Anæmia favors

malaria, favors neuralgia, and hence we often find the teeth of such persons troublesome, very apt to ache on slight provocation and hypersensitive in operations.

Spend about three or four weeks building up such an one on iron and quinine, and see what a different patient you have to operate on.

Dried sulphate of iron	-	-	-	-	gr. iii.
Arsenious acid	-	-	-	-	gr. $\frac{1}{100}$ .
Simple syrup	-	-	-	-	gr. j.

to make a pill. Take one three times a day, after meals. This makes an admirable tonic in anæmic conditions or for anæmic-neuralgia.

Particular care must be observed to keep the bowels open, iron having a tendency to constipate.

These are a few of the means which occur to me as I hasten through this subject, not only to eliminate pain from the patient's teeth, not only to put him in better shape to withstand the pain and fatigue of the operation, but also to effect a permanent improvement of function and appetite.

Take a case of acute abscess. Whether incipient or advanced, administer sulphide of calcium (calx sulphurata) in  $\frac{1}{2}$  gr. doses every three hours. Given early enough it prevents the formation of pus. If suppuration has commenced, it limits its extent and favors early and complete evacuation. To relieve the pain, prescribe at the same time—

Tinct. opii	-	-	-	-	m. xxx.
Aquæ cinnamomii, <i>ad.</i>	-	-	-	-	$\frac{3}{4}$ viii.
M.					

Sig. A teaspoonful every half-hour through the day.

Give also, if the patient's idiosyncrasy does not prevent, sulphate of quinine, in 10 or 15 gr. doses at night.

Always the same care to keep the bowel open also.

Of course local treatments, *i. e.*, operations, are made in such a case, where needed. The systemic treatment is in no sense to the exclusion of local efforts.

A gentleman presented in my office lately with the second lower molar, left side, showing some evidences of ulceration. There was tenderness under percussion, but no swelling and no inflammation apparent. He complained of pains through the side of face and head, and seemingly emanating from this tooth.

The tooth also appeared to ache. There was the remainder of a gutta-percha filling in the tooth, and I agreed with him that the tooth was probably the cause of the trouble, and suggested that I remove the filling and examine it; whereupon he informed me that the nerve had been extirpated from that tooth five years ago and the roots filled, and that the tooth had never given the slightest trouble since. But I opened it; found the canals perfectly in good condition, so far as I could determine. I refilled them and placed the tooth in as nearly the same condition as possible, as it was before, and recommended, first the chloral-hydrate, to secure for him the sleep which he had lost for two preceding nights on account of pain. Then, to open his bowel with a compound cathartic pill and take quinine in 2 gr. doses every other hour for two or three days. This case was an aggravated one, but the pain has left him. Questioning revealed a simple case of over work, attended with some worry.

When inflammation is not present, neuralgia indicates malarial poisoning, and it is not essentially to be associated with a local lesion. The five years of perfect comfort in that tooth should have weighed more against the sole symptom of tenderness under percussion.

My paper has grown too long in spite of my wishes and anticipations. The remaining divisions of Dr. Faught's classification, particularly dentition and pyorrhea alveolaris, deserve papers individually. "The prophylactic conservation of tooth-tissue" is the one line in which, I opine, we all do some prescribing, but in which probably we might all do more.

Many of my ideas, to-night, even the exact language where it was applicable, I have appropriated from Murrell's *Materia Medica*; Shoemaker's and Gorgas' *ditto*, and Dr. L. Ashley Faught.

I hope it may lead to a free expression from all, many of us, doubtless, using other remedies for similar purposes and with equally happy results.

## The Question of Fees.\*

BY DR. H. T. STEWART.

\* \* \* In our enthusiasm for scientific attainments we too often sadly neglect the business side of our practice. Few of us are good business men. It has been so drilled into us that our profession should be followed from strictly professional motives and that the money question should always be a secondary consideration, that we are almost ashamed to speak in an association on the science of remuneration! And yet the science of getting good fees is just as important to the dentist himself as the science of doing good work is to the patient, and with how much better heart we can do good work, and how much more cheerfully we can spend our time learning to do better work if we have the incentive of better fees for better work?

The dentist has too long neglected the science of obtaining adequate but just return for the intense wear and tear of his nervous system, especially when we take into consideration that our average term of usefulness is far shorter than that of men in most other vocations, and that it is by no means either the pleasantest of occupations or the most conducive to health and length of life. Those of us who truly love our profession, in our zeal for scientific attainments, and our ambition to excel in skillful operations, often do ourselves the greatest injustice by overtaxing our strength and failing to replenish our pocket-books.

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\* Extract from a paper read at the Mississippi Dental Association, April, 1897.

## Pyorrhea Alveolaris.\*

BY GEO. B. CLEMENT, D.D.S., MACON, MISS.

\* \* \* If history is correct pyorrhea alveolaris was recognized as a disease, known as "devastation of the teeth," more than one hundred and fifty years ago. It was deemed incurable in those days, and extraction was the treatment. I am honest

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\* Abstract of paper read before the Mississippi Dental Association, April, 1897.

when I say I do not believe we have improved on either name or treatment.

Citing a long list of authorities, beginning with Fanchard, in 1746, and closing with the names of Cravens, Harlan, Younger and Kirk, of today; quoting surgical methods innumerable and medicinal agents galore, to show that the disease has had years of consideration by scientific men, Dr. Clements said: "Can we today take charge of a genuine specific case and cure it? I believe we cannot." After reviewing the various theories as to the etiology of this condition—the germ theory, the calculus or foreign substance theory, the systemic theory, the uric acid theory, etc., he said: "Now we wish to combat each one of these theories, and then we will be pleased to advance ours." Briefly outlined, of the germ theory he says—if the disease was of germ origin it would be contagious if not infectious, and but few mouths would escape its ravages; it would yield to germicidal treatment and recurrence would only be after a secondary infection; extraction would but increase the infection, because it would open up a new field of action for the invading pest; from its character and from its location the periodental membrane is not a tissue to invite the invasion of micro-organisms. After the union is made they pass in and are at all times present wherever inflammation occurs, but not as a specific cause of this specific disease.

The calculus theory, salivary calculus can only excite inflammation by its presence; the treatment is removal.

Sanguinary calculus is but the solidified exudate of a wound; the result not the cause, depending upon inflammation as cause of its formation. Remove the foreign substance, whatever it may be and the tissues reassert themselves and heal.

The uric acid theory. If uric acid be the cause in one case, it must be in all, but of the eleven specimens examined more than one-half fail to show even traces; again, uric acid is never deposited in any tissue where the blood currents are abundant, in sufficient quantity to act as an irritant or poison, or to cause breaking down of tissues. Uric acid poisoning is secondary and symptomatic of some other first cause, some want of functional activity in the renal system or some form of perverted nutrition, and back of this we must have some agent acting as a first cause whose potentiality will disintegrate the albuminous substance of

living tissue. If uric acid be the cause of pyorrhea alveolaris, every case must have as a background some deadly agent which is slowly yet surely sapping the source of life and asking but time to complete its deadly work. Simple extraction usually cures the disease, thus proving that the initial cause of uric acid is not present in each and every case.

The systemic theory. While it is true that many systemic troubles aggravate a specific case of pyorrhea, and that a cure of the disease relieves the oral symptoms, yet how is it that pyorrhea frequently occurs where no such systemic disturbances prevail?

Attention was next directed to the variety of tissues embraced within the alveolar walls; the dental pulp, the dentine, the cementum, the peridental membrane, etc. Of these various tissues we have no two alike, no two performing the same function, and each and every one subject to pathological condition.

Everyone who undertakes the study of this disease theorizes as to the etiology of a disease not positively located as to tissue, taking for granted, however, that it is a disease of the peridental membrane, *per se*.

Dr. Black says the office of the peridental membrane is three-fold—functional, physical and sensory. We go further and hold that its most important function is that of sustaining a vital union between the tooth proper and the organism at large. In its functional office it performs a double duty. It not only forms the osseous structure of the alveolar process, but also the cementum of the tooth. \* \* \* We claim that the cementum, in a physiological condition, affords through the periosteum or peridental membrane, a vital union between tooth and organism. As long as this relationship is sustained, we have no serious trouble, but if the density of the cementum be carried beyond its physiologocial condition, by hyper-calcic deposit or infiltration, the result is exfoliation of the tooth, because, by a perverted nutrition, we have an interference with those conditions by and through which only is there hope of vital union.

## ALL SORTS.

## Practical Methods.

The following articles are taken from the report of the Chicago Dental Society clinics, published in the *Dental Review*:

METHOD OF STARTING A FILLING OUTSIDE OF THE CAVITY WITH THE AID OF MATRICES.—BY DR. S. H. GUILFORD, PHILADELPHIA.

This method applies only to approximal-occlusal cavities in bicuspids and molars, and consists essentially of wedging and retaining the first pieces of gold between the matrix and the cervical margin of the cavity.

The detail is as follows: The cavity is prepared in the usual way except that the buccal and lingual walls need not be given any retentive form. The cervical wall also is not grooved, but is flat; its surface being at right angles to the long axis of the tooth. No starting pits are required. When the cavity has been prepared a band matrix is placed around the tooth and tightened by the clamp and key. The matrix will not hug the tooth tightly at the cervical portion next to the cavity. Instead of bringing this portion of the matrix in contact with the tooth by means of a wedge, as is commonly done, the slight space existing is utilized in holding the first pieces of gold introduced.

In starting the filling; a mass of gold in the form of a soft cylinder or rope, somewhat longer than the lateral depth of the cavity, is carried end foremost and wedged between the matrix and the cavity at its cervical wall. The cylinder or rope is then bent over the margin and pressed down upon the cervical wall. A second and third piece is then introduced in the same way, and the whole malleted firmly into place, after which the filling is continued and completed in the customary way.

By this method the first pieces of gold are held immovable by being clamped between the matrix and tooth; the cervical wall is sure to be covered and protected, while at the same time it is not weakened by grooves or starting pits.

After the filling has been completed and the matrix removed, the excess of gold protruding from the cavity at the cervical margin is trimmed off with a small scalpel and the surface properly smoothed and polished.

CRESCENT CROWN.—BY DR. W. G. WENDEL, MILWAUKEE.

The crescent crown is similar in construction to the so-called Rich-

mond crown, with the exception of the ferrule. In its place was a piece of gold to form a two-thirds band.

Prepare root in the ordinary manner, and adjust a platinum pin accurately in the root; make a cap of platinum to cover surface of root; then drive pin through the cap; remove the cap and pin and solder; replace cap and pin, then fit your crescent band on the lingual surface; then take an impression (modelling compound) of crescent cap and pin; grind tooth to fit the cast, same as for Richmond crown.

There are certain advantages to be derived from this crown, viz: it does not impinge upon the gum at the labial surface and leaves a clear line of continuity between crown and root. Its strength is almost equal to the Richmond crown, and much superior in appearance. It is only applicable to the anterior teeth.

#### GUIDES TO THE ENTRANCE OF ROOT CANALS IN DIFFICULT CASES.

BY DR. J. AUSTIN DUNN, CHICAGO.

By difficult cases is meant bicuspid and molar, with large cavities decayed below the gum margin, especially disto-occlusal, presenting dead or dying pulps, or alveolar abscess.

To facilitate manipulation and meet the requirements of antiseptic treatment, the writer has found the following method to be a great saving of time and annoyance to both patient and operator:

The difficulty in this class of cases is—first, to adjust the rubber dam; second, the difficulty of finding and passing the nerve broach into the canals.

The method proposed to overcome these difficulties is, first, to excavate the cavity without the rubber dam, flushing freely with medicated water, finding and opening the entrance to the canals; second, small wedgwood pegs and copper points, together with the alcohol lamp and Gilbert's temporary stopping, should be provided at hand, and by means of a hand matrix, the rubber dam and gum is forced back and held firmly with the left hand while the cavity is dried, and either the copper or wood points forced into the entrance of the canals.

The temporary stopping is then packed in and around the pegs until the cavity is filled. The matrix and points can then be removed, presenting simple "entrance guides" to the root canals.

The time consumed in this first operation should not exceed thirty minutes in most cases.

For subsequent manipulations the rubber dam can be easily and quickly adjusted, the treatment made and the entrance guides closed with a very small piece of temporary stopping, making a clean, dry dressing, and thus avoiding the filthy cotton stoppings.

Treating teeth prepared in this way is a pleasure rather than something to be dreaded.

Third, where decay has involved the buccal side, and perhaps the mesial or distal angle, preventing use of the rubber dam for treatment, prepare the cavity, making good anchorages; fix the pegs in the canals and fill permanently with amalgam, in and around the pegs. The latter can be removed before or after the amalgam has hardened.

Fourth, when a tooth is to be crowned, but decayed so as to preclude the use of the dam for necessary treatment, the root should be prepared and the gold band fitted for the crown at once, cement placed about the lower edges and driven to place; the rubber dam is then adjusted and entrance guides found by means of the pegs, as described.

When the treatment is finished and roots filled, the bite is taken, the band removed and the operation completed in the usual way.

The use of a hand matrix is necessary for this class of work, because more or less force is required to carry and hold the rubber dam and gum back so as to clearly expose the cervical borders. It can be bent and adapted to any form of tooth, besides it can be put in position at once, and is a time saver: by its use also entrance guides can often be made with a temporary stopping, without the rubber dam.

The writer believes that a great many failures in the treatment and filling of root canals is due to the lack of some means to guide and carry the nerve broach, medicaments and gutta-percha into the canals, and for this reason urges the use of entrance guides to canals that are small or in such a position as to obstruct sight and free manipulation, in which case a long or short funnel guide can be formed, as described, in two or three minutes, by means of which the gutta-percha can be controlled and made to flow directly and readily into the canal.

If doubtful as to the merits and practicability of the scheme proposed, a trial in the way of practice on teeth outside of the mouth is suggested.

#### A METHOD OF PLACING GOLD FILLINGS, TIPS OR CONTOUR ON PORCELAIN TEETH.—BY R. D. WIKOFF, CHICAGO.

First the tooth is ground in any desired shape; a piece of platinum foil is brought to a white heat to soften it—holes punched or the foil forced over the pins in the back of facing—then trimmed to fit the tooth, except where filling is to be inserted. This is left wide or long enough to be brought to the front of the facing; another backing of 28 gauge platinum, is cut to the size of tooth, holes punched for pins, placed on tooth, pins bent down to fasten, and if for plastic work, bent so as to be caught and held by rubber in vulcanizing. The first backing of plati-

num foil is then burnished to the ground surface of tooth, and brought around to the face far enough to be caught and held by investment; then invested, leaving the slot open to be filled with pure gold flowed in with blowpipe; then turn over on face and solder flowed all over backing to stiffen. Cooled, removed from investment, and finished by grinding, emery, paper disks, etc., as you would any filling, always working the gold toward the tooth.

A SPECIAL POINT IN ROOT CANAL FILLING.—BY DR. A. H. PECK, CHICAGO.

Having the canal thoroughly dried and ready for the filling, it should be slightly moistened with oil of cajeput, following this with only enough chloro-percha to slightly moisten the inner wells of the dentine, then the gutta-percha cones should be pressed into the canals as far as possible with the pliers.

Instead of heating the points of the canal pluggers for the purpose of softening the gutta-percha cones for packing, soften them with a few blasts of hot air from the syringe, and this will accomplish the purpose thoroughly well. The gutta-percha may now be packed easily, thoroughly and with much comfort, because it will not adhere to the plunger point and thus be constantly drawn out of the canal.

PORCELAIN CROWN WITH BAND, NEW METHOD.—BY DR. C. E. ESTERLY, LAWRENCE, KAN.

The method of constructing a porcelain crown with band, that I will describe, is best suited to the bicuspid teeth, but is applicable to the six anterior teeth in a great many cases.

The root is trimmed as for any banded crown to insure fit under the margin of the gum. The end of the root is so shaped as to form two plain surfaces meeting each other in a line conforming to the curvature of the arch. The angle at which they meet, varying to suit the case.

The plain surface extending from the crest to the periphery of the root, dipping below the free margin of the gum.

From the crest to the plane may be so inclined as to leave the periphery of the root at this point as high above the gum as practicable, furnishing the maximum strength.

The post is accurately fitted to the hole in the root, as much depends on a strong, well fitting post. I have been using a square tapering post. The post is bent to conform with the alignment of the teeth, the porcelain facing fitted, the pins bent around it loosely so as to be easily removed.

A band of suitable width for case in hand is fitted and the inside is scored with an instrument showing plainly a line corresponding to the periphery of the root.

This mark on the inside can be accurately transferred to the outside and a slot sawed cutting out the line. This can be done without bending by using a very fine saw in the ordinary saw frame or with the small circular saw for the engine. A piece of plate is inserted in the slot and soldered.

This is trimmed off and the band thus strengthened can be easily cut to shape and placed on the root.

A notch or mark will mark the opening in the root, and trimming to line is completed.

A piece of plate is now soldered over the opening completing the cap which does not differ materially from the ordinary cap for roots, but has a unique extension on the inner side, which is the feature of the method. The cap is placed in position on the root and the corners are bent against the adjacent teeth at proper points of contact.

The partial cup formed by the extension is for the reception of the porcelain body, insuring increased strength, accuracy in filling the space, materially assisting in forming correct contour and occlusal surface.

A hole is drilled through the cap at point marked, slightly smaller than the pin which has been fitted in the root. When this is driven to place, if a square tapering one, when removed will remain in proper position to be soldered without investing.

The complete metal part of the crown is placed in position, and the partially ground facing is fitted and pins bent tightly around post. (If this cannot be done, it must be waxed in place, invested and soldered). The tooth is tried in the mouth after first baking and corrections in articulation noted.

The use of this method for the superior anterior teeth prevents fracture on the inner side where there is not sufficient space for porcelain unsupported. The metal used in this crown is either platinum or iridio-platinum, pure gold as solder.

When the crown is completed for the mouth, it is electro-gilded, rendering the color more slightly. Ease of construction, accuracy, strength and artistic results, notably where special coloring is required, are the points I have found this method to possess.

**A METHOD OF REPLACING A BROKEN FACING ON A BRIDGE OR RICHMOND CROWN.—BY DR. J. B. MONFORT, FAIRFIELD, IOWA.**

Remove the remains of the tooth, cut off the pins, drill two holes the size of the pins of teeth, parallel to each other, through the backing, usually about the same position that the pins were; but this is not particular. Into the concavity of the backing burnish a piece of thin platinum, punch holes to correspond with holes in the backing; into these

holes drop two platinum pins, taken from broken teeth, with the heads up. Remove carefully, and solder pins to platinum with pure gold. Then replace in the concavity, trim and burnish so as to fit perfectly. Into this matrix drop some hard wax; when hard remove and invest, pins down, in plaster and silex; when hard remove wax. Now take porcelain body of the proper shade, mix as stiff as possible and fill the platinum matrix; take the broken facing, place it over the body and press it into place, removing excess of body; place this over a gentle heat to thoroughly dry the body, then place in your furnace and fuse. When cool it is ready to put in place in the bridge. You will find it will fit perfectly. Place a little cement in the concavity of the bridge and press it home. The pins may be either cut off and riveted or secured by burs run on the pins, using Dr. Bryant's repair instruments.

COMBINATION OF PRECIPITATED GOLD AND OXYPHOSPHATES.—BY DR. W. V. B. AMES, CHICAGO.

Dr. Ames demonstrated the method of combining precipitated gold and oxyphosphate of zinc. The gold used is in loose crystals of about the form of those composing "White's Crystal Mat Gold." The brownish color of crystals depends on the formation of a film of oxide of gold on their surfaces during the process of precipitation.

It is evident that this film of oxide enters into the cement formation making the gold truly a part of the mass rather than a foreign mixture, as would be the case if bright yellow crystals were used.

The gold precipitate is added to the acid to the extent of forming a more or less stiff paste previous to the addition of the zinc oxide.

ANESTHETIZING OF PULP FOR IMMEDIATE REMOVAL BY CATAPORESIS.  
BY DR. W. W. MOORHEAD, ALEDO, ILL.

The method of treating such a case is as follows:

The rubber dam being adjusted, the cavity washed out, and sterilized, place a pellet of cotton saturated, but without a surplus, to run around the other teeth, with the following medicament in the cavity:

Cocaine . . . . .	grs. 18
Aconitine . . . . .	grs. $\frac{1}{10}$
Thymol solution, Q. S. . . . .	3 i

To this apply the positive current, turn on fifteen or eighteen volts, and should this not be sufficient to reach the apex make a second application, and remove the pulp immediately.

METHOD OF ATTACHING BRIDGES TO ANTERIOR TEETH WITHOUT AMPUTATION OF NATURAL ROOTS.—BY DR. S. FINLEY DUNCAN, JOLIET, ILL.

Open pulp chamber and root canal through lingual surface of tooth and in a line with root canal. Enlarge opening and canal and cut a

groove to the proximal side of tooth next to the space to be bridged. Into the opening and groove burnish pure gold plate about 28 or 30 gauge. Make a small opening through gold plate opposite root canal. Force iridio-platinum wire, square, about 16 gauge and pointed, through plate and up into root canal. Remove plate and wire post together and solder with 22 karat solder.

Place back in position in tooth and fit accurately to margins of groove preferably with a foot shaped serrated plugger. Remove, invest and flow 20 karat gold or solder on lingual side of plate until it has the proper shape and contour; thus forming what may be termed an inlay for want of a better name. The bridge may then be soldered to this in the same manner as to any other abutment, and the entire appliance cemented into place.

FORMATION OF CAVITIES IN PORCELAIN TEETH.—BY DR. G. W. WHITEFIELD. OF EVANSTON, ILL.

*Forming cavities in porcelain teeth applicable for crown and bridge work, to make the porcelain teeth harmonize with the natural teeth in the mouth.—Often a perfectly formed porcelain tooth, either on a plate or as a crown, is inserted in a mouth where all the natural teeth show fillings, thus stamping it at a glance as false.*

By forming a small cavity in the side and filling with gold, cement or amalgam, the harmony in the mouth is retained.

Dr. Whitefield demonstrated how these cavities may be cut with plain copper points corresponding to a No. 9 oval bur, and a No. 3 thin wheel bur to form the undercuts.

These points dipped in oil and diamond dust cut freely and rapidly. Cavities may be formed to harmonize with any case. Carborundum can be used in place of diamond dust, but is not as satisfactory.

Add a little salicylic acid to a solution of gum cassia to prevent fermentation. Keep this in the office to apply. Three or four coats of this varnish applied to the underside of saddle bridges and the outside of bands of crowns will, when it dissolves out, positively free all adhering portions of cement—they will work out from under the bridge.

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### A Suggestion about Condensing Gold.

On a large masticating surface thorough condensation is of more importance than in an interstitial filling.

It is noticeable that cusps of crowns when made of pure gold will, after a certain time, become quite rough under mastication. This, I

think, is sufficient evidence that to make a good masticating surface to a filling, we must hammer that gold as hard as possible, and not only make it hard, but see that the layers of gold are all as nearly parallel with the surface as possible, and when we come to polish, we must not cut too deeply with stones or disks, for by so doing, we may get down below our carefully hardened surface to less dense gold. Consequently it is far wiser to leave one or two traces of the plugger point than to polish to a perfectly smooth surface.—J. P. HEDRIDGE, *Jour. Brit. Asso.*

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### To Open Pulp Chambers of Teeth affected with Pericementitis.

We often have to open up teeth which are very tender to the touch. The pressure necessary to make a steel drill enter the outer layer of enamel, together with the shocks caused by the revolutions of the flat-sided drill upon the uneven surface of the tooth, causes excruciating pain. To avoid this, grind, with a small stone, a pit at the point at which you wish to enter the tooth. The drill will then run smoothly and penetrate much more easily. When desiring to open on the palatine surface of the incisors or canines, after grinding the pit, take an inverted cone bur, but a little larger than the drill intended to be used, and cut into the pit the depth of its diameter. This gives a flat surface for the point of the drill to start into, and avoids the shocks before spoken of. Keep the point of the drill well lubricated with oil of turpentine or glycerin.

—R. E. SPARKS, *Dominion Journal.*

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### Electric Annealing of Gold.

Mons. P. H. Poinsot makes use of a 110-volt apparatus, with an intensity from 80 to 100 amperes. Such currents will volatilize gold foils, for the amperage must be in direct ratio to the section of the metal amenable to electric treatment. He does not exceed, in consequence, two and a half amperes; uses No. 3 foils, supplied by S. S. White Company. Every sheet is cut in two parts, and rolled into a rope, or folded into tape; then each piece is cut into two equal parts, and each extremity of every string so formed is placed on two flat posts, one fixed, the other being movable, in order to apply to the variable length of the strip. Through this gold passes an electric current, giving progressively from 0 to 2.5 amperes—the operation lasts half a minute. The gold is then cut into pieces required. It can be used at once, or kept for use; must be kept very clean and very close, and passed lightly above an

alcohol flame before using. It keeps the whole softness and malleability of soft gold; every morsel is spread out with facility, without any tendency to shrink. It is pliant under pressure; does not curl; does not harden at its surface, as cohesive gold commonly does, but possesses to a superlative degree the cohesive properties. It realizes fully the ideal sought for in vain until now—the easy adaptation of soft gold united to the resistance of cohesive gold.—*Dominion Journal* (from the French.)

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### Blood Supply of the Skin.

Van Lair and Sherrington have made extensive investigations of the nerve supply of the skin with most interesting results, the former confirming the researches of Arloing and Tripier. These observations have shown the astonishing fact that each individual area of the skin, no matter how small, is supplied with four sets of nerves, these nerves all coming from the same plexus. The consequence of this fact is that in order to destroy the cutaneous sensibility of a finger it is necessary to divide all four of the collateral nerves which supply it. Investigations show that a single nerve is capable of maintaining cutaneous sensibility for the entire leg. This throws light upon paradoxical phenomenon long known but not understood—that the division of a nerve is not necessarily followed by a loss of sensibility in the area to which it is distributed; and also the interesting fact which has not been heretofore fully appreciated—that there are many nerves which fully supply the areas of other nerves, for instance, the popliteal nerve.—*Modern Medicine*.

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### The Heat Conducting Power of Metals.

After a thorough investigation of this subject, Herr W. Beglinger has arrived at the following conclusions: The results show that the heat conducting power of the different kinds of iron is altogether different. It is, therefore, of the greatest importance to know the co-efficient of the inner heat conducting power. Steel and wrought iron show a more uniform behavior in this matter than cast iron. It is not confirmed that hardening reduces the conducting power of steel by almost one-half, though it may be conceded that hardening will reduce it slightly. The difference in working, by forging or rolling, showed only in one case, with wrought iron, considerable differences for the conducting power. Casting seems to cause far more irregularities.

Wrought iron showed generally better conducting power than did steel. Herren L. Holborn and W. Wien have compiled a table showing

the heat conducting power of the different values. The average value for the different kinds of iron and steel is given. The factor, R, indicates that through a plate of 1 centimeter thickness at a difference of temperature of  $1^{\circ}$ , for 1 square centimeter each, a quantity of heat passes which will increase the temperature of R gramme of water by  $1^{\circ}$ :

Copper.....	R=0.918
Iron.....	R=0.156
Steel.....	R=0.062 to 0.111
Zinc .....	R=0.292
Tin .....	R=0.150
Lead.....	R=0.079

—*Scientific American.*

## BRIEFS.

**Alsol** is a trade name given by a German firm to aluminum acetotartrate.

**Boralid** is a mixture of equal parts of acetanilid and boracic acid (*Pharm. Zeit.*)

**Formalin** does not attack surgical instruments even on an exposure of indefinite duration.

**One Hint.**—The operating-coat should be suitable in texture and color and always neat and clean.—*Dr. Werner, International.*

**A fossilized tooth** of some extinct species of animal recently found in Cedar county, Neb., weighs  $14\frac{1}{2}$  pounds.—*World's Progress.*

**To Harden Rubber.**—According to a German chemist, rubber can be hardened by mixing powdered aluminum with the rubber before vulcanization.

**Artificial Camphor** that closely resembles the natural product is now manufactured by passing hydrochloric acid into spirits of turpentine surrounded by a freezing mixture.

**For the Protection of Cement Filling.**—Resin and wax equal parts, melted on spatula and poured on filling before it is wet, is superior to either wax or paraffin.—*Med. Brief.*

**An Application for the Hands.**—A simple lotion of rose-water, glycerin, and alcohol is an agreeable application to use each time after washing the hands.—*Dr. Werner, International.*

**When filling crown cavities** with oxy-phosphate always burnish the enamel powder into the surface of the filling before it is perfectly hard, as this prolongs its insolubility.—*Med. Brief.*

**To remove dirty wax.**—Melt in water; when cool, scrape the dirt from the under side; melt again in pure water, and add one teaspoonful of sulphuric acid when it comes to a boil.—*Med. Brief.*

**Instrument Sterilization.**—There is no means so certain for sterilization of instruments as boiling after use and leaving with some preparation, such as oil of cassia, on them.—*G. Newkirk, Digest.*

**To Make a Concave Disk** take a thin mounted corundum stone, hold near the flame to soften, then, while revolving rapidly in engine, press thumb or stick against the back of the disk.—*Dr. Pesso, Inter.*

**Chlorid-of-ethyl spray** directed into the alveolar cavity will stop severe hemorrhage after tooth extraction. The cavity should then be filled with cotton wet with tincture of hamamelis.—*Gaz, Med. de Liege.*

**Cement for Celluloid.**—Colluloid may be firmly attached to wood, tin, etc., by using a cement composed of two parts of shellac, three parts of spirit of camphor, and four parts of strong alcohol.—*Amer. Druggist.*

**Size of the Solar System.**—Enormously large as the solar system absolutely is, compared with the size of our own earth, it is, compared with the size of the visible universe, merely as a drop in the ocean.”—*J. G. Gore.* Yet some people think they’re great.

**Bridge-Work not Cleanly.**—In my opinion permanent bridge-work, except small pieces, cannot, as a rule, be kept in a cleanly and wholesome condition, and is one argument against its use.—*Dr. Wilson, International.*

**Neuralgia Cure.**—Try equal parts of benzoin and peppermint oil. Rub on affected part or sprinkle on a cloth wrung after being dipped in hot water. Used either way, in many cases it works like a charm.—*Stomatological Gazette.*

**Treatment for Septicemia.**—The latest treatment for general septicemia is the hypodermic injections of creosote. The creosote mixed with equal parts of camphorated oil and twenty minims of the solution are injected three times a day.

**Cause of Failure of Amalgam Fillings.**—I am convinced all cases of recurring caries which may be properly called failures are due to two general causes—bad amalgam and defective preparation of cavities.—*G. E. Hanna, Dominion.*

**Quick Setting Amalgam.**—For quick-setting amalgam cast an ingot from any high grade formula, and cut from it as wanted for rapid setting. By washing it will set about as rapidly as cement, and become hard.—*S. B. Palmer, Dental Practitioner.*

**Iodine in the Human Body.**—It has recently been discovered that iodine exists in combination in the human body. It occurs in the thyroid gland, and may be concerned as the essential chemical substance in the internal secretion of that gland.—*World's Progress.*

**To Replace a Tooth on a Bridge.**—It is almost always possible to bore a couple of holes in the backing and cement a new tooth in the place of the broken one. This can be done with safety and certainty if the conditions are favorable.—*Dr. Wilson, International.*

**Acid Reaction.**—Did it ever occur to you that listerine, euthymol, borolyptol, electrozone and pyrozone all had an acid reaction? Hydrozone has a more intense acid reaction than any of the above named agents. Nearly all of the  $H_2O_2$  has an acid reaction.—*Review.*

**Fitting Crowns on Badly Decayed Roots.**—Secure anchorage in the root by means of a screw-post, as, for instance, a How post, then build amalgam around it and restore the shape of the roots with amalgam. When hard, polish and fit the band as usual.—*Dr. Cooke, International.*

**To Make a Perfect Cast.**—Marble dust and glycerin—about 4 ozs. glycerin to a quart of marble dust—makes a beautiful cast. I have been using it for a long time and like it better than anything else I have ever tried; in fact, can find no fault with it.—*Chas. P. Grout, Off. and Lab.*

**Cocain which does not Deteriorate.**—A 20 per cent. aqueous solution of cocaine containing one or two drops of Calvert's carbolic acid, which has proven very satisfactory, preserves the solution for weeks, yea, for months, if in a brown bottle and tightly corked.—*V. Munier, Items.*

**Detection of Water in Alcohol.**—The presence of small quantities of water in alcohol sold as *absolute* may be detected by the use of a little potassium permanganate, which is insoluble in absolute alcohol. Dropped into alcohol containing over 1 per cent. of water a reddish tinge is imparted to the fluid.

**Lactic Acid for Opening Root Canals.**—I began the use of lactic acid as a substitute for sulphuric acid for opening fine canals. I find it also a wonderful cleanser, rapid and sure. I find, after well soaking a putrescent canal with lactic acid and drying out, that pyrozone gives no chemical action.—*W. N. Avery, Stom. Gazette.*

**Treatment of Aphthous Ulcers.**—Swab them with a mixture of honey, alum and borax, one-half honey, one-quarter each of powdered alum and borax, applied by means of a swab or camel hair pencil to the ulcers. The systemic treatment is by means of small doses of magnesia Phillips' milk of magnesia being a good anacid.—*Office and Lab.*

**Aromatic Spirits of Ammonia** as a heart stimulant in cases of fainting or collapse occurring from any cause, as from an anesthetic, will revive patients by reason of its rapid absorption, and produce greater activity of circulation than anything with which I am acquainted. You may use fifteen drops of it in a little water.—*T. W. Brophy, Review.*

**Eucain B.**—This very closely resembles encain A., and also resembles tropacocain, but is very much less toxic. The hydrochlorid is not decomposed on boiling, the solution has a neutral or very slightly alkaline action and is used in ophthalmology in a two per cent. solution. The systematic name of Eucain B. is nenoil-vinyl-diacetone-alkamine.—*Amer. Druggist.*

**To Make Good Solder.**—For a high-grade solder it has been my custom to melt together a pennyweight of coin gold and six grains of S. S. White's eighteen-carat solder, which makes nearly twenty-one carat and of a color hardly to be distinguished from coin. It requires care in manipulating, but after a little practice it can be worked nicely.—*Dr. Pesso, International.*

**To Make Corundum Points**, from new corundum, soften a small piece and place it upon a mandrel or worn bur or drill. Then passing it through the flame of the spirit lamp until the shellac is partially melted, mold it deftly between the thumb and finger, and while yet soft place in handpiece and revolve under light pressure to true up.—*J. E. Adams, Digest.*

**To Wind a Bristle with Cotton Fiber.**—Dip a smooth bristle into a gummy liquid (I use gum sandarac or liquid silex with equal success), then, with as much or little cotton as desired, first roll, then twist the bristle between the thumb and finger, taking pains that the fibers of cotton run somewhat with the length of the broach, and thus insuring a hold on the cotton.—*Dr. Avery, Stom. Gazette.*

**Restore Contour.**—Every operator in treating decay in approximate surfaces should endeavor to fully restore contour, thereby greatly promoting the comfort of his patient and the general healthfulness of the mouth. For the normal arrangement of the teeth is a continuous, uninterrupted grinding surface, and spaces between approximate surfaces are unclean, annoying and detrimental.—*J. W. Werner, International.*

**Arrangement of Instruments.**—Much valuable time may be wasted by an unsystematic arrangement of the necessary instruments for daily use—or from an unfamiliarity with and an unskilled use of the same—and also by an indecision in quickly selecting the one best suited for a particular case. A good rule is to have a few carefully selected instruments, and to learn to use them well.—*Dr. Werner, International.*

**Tooth Cleaning.**—I think that the time and physical exertion consumed in properly cleaning a set of teeth which are affected to any considerable extent, or have any amount of deposit upon them, and the subsequent treatment of the gums and teeth, are least appreciated in importance by the dentist himself, and as a consequence by his patient, of any operations that we as dentists are called upon to perform.—*I. A. Freeman, Digest.*

**Investing Material.**—One of the best investments for metal cases that are required to withstand a very high degree of temperature, is a mixture of two parts of not too fine plaster of Paris to one part of ground asbestos, grade 3, that has been passed through a number 12 sieve, to rid it of any coarse fibers. If the plaster is strong, a little less of it may be employed in the mixture. This will not crack or shrink.—*Dental Practitioner and Advertiser.*

**To Make a Solid Gold Crown.**—Stamp cusps of thin soft platina and trim to size. Proceed to articulate. It may be dinged or bent to suit the case. Now melt it full of gold scrap of any desired grade. It will now be found that while the platina has retained the shape of the cusps its color has almost entirely disappeared. If any remain and is likely to be exposed it may be removed in the finishing process.—*R. E. Sparks, Dominion Journal.*

**Lactic Acid and Ammonia in Root-Canal Treatment.**—Where I find a canal too fine for the entrance of a barbed broach I use a smooth bristle, and work into the canal with lactic acid and aqua ammonia fortior alternately. By this method I destroy the fiber and open the canal, and can usually get the bristle entered wound with a shred of cotton, which carries the medicaments to the foramen. Falling back to the barbed broach I seldom fail of success.

**To Make Gutta Percha Points.**—Clip up a piece of sheet gutta-percha into pellets of a size experience teaches will make the desired point. Place on a warm slab or pass separately over the alcohol flame. Now, with a card between the thumb and finger, roll the pellet on a glass slab with the thumb raising the card to an angle with the surface

of the slab. A little practice and you can make a gutta-percha point of any size and shape.—*W. N. Avery, Stom. Gazette.*

**Calmness Deceptive.**—Sometimes the apparently calm appearance of a patient may be deceptive, the calmness really being unnatural, and it behooves us never to become so engrossed in the work which we have in hand as to forget that we are working upon a highly sentient organism. We must keep a watchful and sympathetic eye to detect symptoms of nervous exhaustion and be prepared to combat the same by any means in our power, both moral and therapeutic.—*British Journal.*

**A useful Modelling Composition** can be made from the following :

Stearin	-	-	-	-	-	25	grammes.
Copal, semi-soft	-	-	-	-	-	25	"
Talcum, powdered	-	-	-	-	-	50	"
Carmine	-	-	-	-	-	0.5	"
Oil, rose geranium	-	-	-	-	-	6	drops.

—*Dr. David, Journal de Pharmacie.*

**Mouth Wash—**

Acid Carbolic Crys.	-	-	-	-	-	3	ij
Ol. Cassia	-	-	-	-	-	min.	xx
Alcohol	-	-	-	-	-	3	iij
Silico-fluorid of Sodium	-	-	-	-	-	gr.	xi
Distilled water add q. s.	-	-	-	-	-	3	xvj

M. This may be used full strength or diluted 1 to 3 in water.—*Dental Review.*

**A Convenient Bur Holder.**—I have found it rather preferable to keep my burs for the dental engine in small shallow trays painted white, which fit into a shallow drawer in the cabinet, than in a bur-stand, or in the draw provided for them in the "Allen" table. The trays being painted white, it is easier at once to pick out the size and shape one wants to use, and it is also a help to have the different varieties separated from one another, as they are by the different divisions in the trays.—*A. T. Croucher, Jour. Brit. Asso.*

**Varnish Cavities.**—Varnish cavities before filling with gutta-percha ; it forms an inseparable union with dentine. When front teeth are to be filled with gutta-percha where the enamel is transparent, varnish and line with two thicknesses of gold foil, which has been prepared by being stuck together with varnish, and also varnished on both sides. The filling may become worn and be refilled ; the lining shows as beautiful as a new filling, and will not be disturbed in excavating the old filling.—*S. B. Palmer, Dental Practitioner.*

**Set Crowns and Bridges with Gutta-Percha.**—I set a great many of my bridges and nearly all of my single crowns with gutta-percha. I use Doherty's white base-plate gutta-percha; put that around the pin and around inside the band. This is forced into place while the root is yet moist so that it can be readily withdrawn and the surplus trimmed away. Then after preparing the root, dry it and clean it thoroughly, put in a little chloro-percha and set your crown in place. If you have a bridge you can set it equally well.—*Dr. Belyea, International.*

**To Line Rubber Clasps with Gold.**—As metal clasps have been found less destructive to teeth than rubber clasps, Dr. Randorf, in *Items*, says: "It would be well to test this by lining all rubber clasps with gold, which may be readily accomplished. Use a thin band of fourteen or sixteen karat gold to which the rubber may be made to adhere either by punching holes or by soldering on it small eyes. Pure platinum or fine gold are not as well adapted to this purpose as the lower alloys, but the impure metals will not serve at all. The band should not be too thin as the edges would then be too easily bent.

**A Hint on Extracting.**—I have often seen an operator's face and shirt front bespattered with blood, from extracting teeth, while the patient was under an anesthetic. This is unnecessary. I use nitrous oxide as a general anesthetic. The moment that the inhaler is taken from the face I push a small sponge into the mouth; this prevents roots, which I may drop in the mouth, from being drawn back into the trachea, and absorbs the blood which would otherwise be swallowed or blown out in the operator's face, and does not prevent breathing, as the patient breathes through the nose.—*E. A. Randall, Dominion Journal.*

**Decomposition of Potassium Iodid Solution.**—The decomposition observed is attributed to impurities in the water used, and such decomposition does not occur where the water used in making such preparation is distilled in a glass retort. The distilled water ordinarily found in laboratories and drug stores contains an oxidizing substance acting somewhat like hydrogen peroxid. This disturbing factor is always present in water distilled from a copper retort, while that distilled from iron or tin retorts is free from this substance and does not decompose potassium iodid.—*Eschbaum, Pharm. Zeit.*

**Restoration of Teeth Without Crowning.**—Devitalized superior cuspids often break seriously, leaving but a shell which would not of itself hold any sort of filling for a great length of time. It seems to be the general custom to crown such teeth, but should there be enough of the labial enamel remaining to give a fairly good appearance, the writer derives more satisfaction and he believes a stronger result from cementing.

a screw into the root and restoring the contour with amalgam, zinc phosphate being used against the thin labial enamel to prevent the amalgam from showing through. At the next sitting the amalgam in sight is grooved and covered with gold.—*S. E. Davenport in International.*

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### In Memoriam.\*

ON assembling for our annual meeting, which is the thirty-fourth since our organization, we are pained to record the loss, since our last meeting, of the following named members: Dr. J. C. Gifford, of Westfield, N. Y.. who became a member in 1873; Dr. W. E. Magill, of Erie, Pa., an active member since the society's inception; and Dr. E. E. Parshall, of Frederick, Pa., who became a member in 1894, and died in Parkersburg, W. Va., in February, 1897. Of Dr. Parshall it may be said, though one of our youngest members, he had assumed an honorable and active position in his profession and in society, and his untimely death is a great loss to this association and to the community in which he labored. Of Dr. Gifford it may be said, he has for years stood as one of the landmarks of the profession in which his energies centered. He passed away beloved and respected by all.

Of Dr. Magill we feel that too much cannot be said in his praise. We mourn his loss the greater as he was ever in attendance at all our meetings of district and State. The inspiration of his presence and the energy of his activity has always stamped him as a tower of strength amongst us. His influence was always good and pure, and ever on the side of improvement, ready to advise with all, and help with hand or pen, that he might advance the profession of his choice. His was a life to be imitated. Though the bloom of his physical manhood faded, the fragrance of his worthy deeds remains and will ever be with us to stimulate us to worthier motives and more ardent work. We mourn his loss and extend our sympathy to his sorrowing family.

J. A. TODD,  
D. C. DUNN,  
A. C. McALPIN.

\* Presented at Lake Erie Dental Society, May, 1897.

## SOCIETIES.

## Northern Ohio Dental Association.

THE Thirty-Eighth Annual Meeting of the Northern Ohio Dental Association will be held at Put-in-Bay (Beebe House), June 15-16-17, 1897, commencing Tuesday, at 2 p. m.

Papers will be presented as follows: "The Matrix," Dr. E. B. Lodge, Cleveland. "Considerations Relating to the Loosening of the Teeth," Dr. Hugh Mitchell, Canton. "Compulsory Prophylaxis with Industrial Aspect," Dr. S. D. Stewart, Akron. "The Lower Third Molar," Dr. W. H. Todd, Columbus. "A Plea for the Dental Laboratory," Dr. Geo. H. Wilson, Cleveland. "Electro Therapeutics," Dr. W. A. Price, Cleveland. "Courtesy in Reference to Others' Failures," Dr. F. D. Davis, Minerva. "Root Treatment by means of the Silver Salts and Cataphoresis," Dr. L. P. Bethel, Kent.

## CLINICS.

"Gold and tin fillings," Dr. W. B. Conner, Akron.

"Crown-work," Dr. D. A. Allen, Toledo.

We hope to get a meeting of Delta Sigma Delta at the same time, which will insure additional interest.

There is good fishing at this time of year, you know. Come.

L. L. BARBER, *Cor. Sec'y.*

## American Dental Association.

THE thirty-seventh annual session of the American Dental Association will be held at Old Point Comfort, Va., commencing at 10 a.m. on Tuesday, August 3, 1897.

GEO. H. CUSHING, *Rec. Sec'y.*

## Michigan Dental Association.

THE annual meeting of this society will be held at Battle Creek, Mich., June 8-9-10, 1897. A feature of the meeting will be a hygienic dinner to be given at the Sanitarium by Dr. J. H. Kellogg.

An interesting meeting is expected and all members of the profession are invited to attend. H. C. RAYMOND, Sec'y.

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### Chicago Dental Society.

OFFICERS for ensuing year are as follows:—President, A. H. Peck; Vice-President, D. M. Gallie; 2d. Vice-President, G. T. Carpenter; Rec. Secretary, E. Ma Whinney; Cor. Secretary, G. B. Perry; Treasurer, E. D. Swain; Member Board Directors, J. N. Crouse; Censors, D. M. Cattell, A. W. McCandless, J. J. Whaley.

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### Lake Erie Dental Society.

At the annual meeting of this society, held May, 1897, the following officers were chosen for the ensuing year: President, W. E. Jackson, New Castle, Pa.; Vice-President, A. McAlpin, Bradford, Pa.; Secretary, W. E. Van Orsdell, Sharon, Pa.; Treas., J. H. Heively, Oil City, Pa. Board of Censors: G. W. Green, C. D. Elliott, D. C. Dunn. Ex. Council, to serve three years, J. A. Libby and H. E. Dunn. Next place of meeting, Cambridge, Pa., in May, 1898.

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### Lima Dental Society.

A NEW dental society has been organized at Lima, O. Meetings are held the first Monday in each month. Officers are: President, Dr. G. H. Irwin; Vice-President, Dr. Downard; Treasurer, Dr. A. Jones, and Secretary, Dr. J. A. McIndoe.

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### Commencement.

THE commencement of the Dental Department of Western Reserve University, Cleveland, was held Monday, May 17, 1897. Graduates 32.—Matriculates 93.

# THE OHIO DENTAL JOURNAL.

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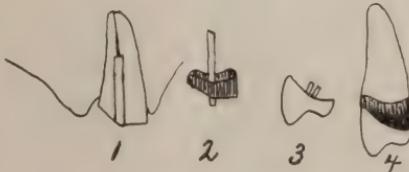
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## CONTRIBUTIONS.

### Bicuspid Crown.

BY W. C. GRAHAM, D.D.S., LANCASTER, O.

THE preparation of the root for the reception of this crown is the same as any other band crown. The best results are obtained, however, by shaping end of root, as in Fig. 1. The



cap, Fig. 2, is made to fit perfectly to the end of the root, and when in place an impression is taken in plaster; at the same time the bite is secured. When set, remove the plaster, which will likely carry with it the cap and pin; if not, remove them and replace in proper position in impression. A cast is made from this impression, letting enough plaster remain to form an articulator. The bite is then poured and when sufficiently hard the impression is to be removed. We now have the cap in correct relation in the model. The tooth to be used is an English plate tooth, Fig. 3, which is selected to suit in color and size. Pure

The editor and publishers are not responsible for the views of authors of papers published in the **OHIO DENTAL JOURNAL**, nor for any claims that may be made by them.

gold or platinum is now burnished on the pins for the backing, care being taken to have it thoroughly burnished well down in the concave side of the tooth. The pins are then turned down toward the inner cusp, or the backing secured by splitting the pins.

When ground to place it is secured with wax, and the cap and tooth removed from the model and invested in sand and plaster, and soldered. When finished it will have the appearance of Fig. 4.

The advantages claimed for this crown are, perfect protection of end of root; the small amount of solder required, thus reducing cost; the natural appearance, as no gold will show; the strength of finished piece, as the force of mastication is sustained by the tooth acting directly on the pins which have a firm attachment in a large body of porcelain. It has all the strength of a Richmond, and all the beauty of a Logan.

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### The Matrix.\*

BY E. B. LODGE, D.D.S., CLEVELAND, O.

It is not without some degree of hesitation that I decided to write a paper on this subject since I am directly interested in an instrument of my own devising. Yet feeling that the matrix is an instrument which should be largely used, and believing it is a subject upon which not much has been written of late, the writer has chosen to consider it.

The purpose of the dental matrix is to facilitate the operation of filling proximate cavities in bicuspids and molars and at the same time to insure correct contour and knuckling of the tooth when restored. With the application of the matrix the elements of a proximate cavity are converted from one complex and difficult in form to one that is comparatively simple. The essentials of a matrix consist in a piece of metal enveloping a whole or a part of the tooth to be operated upon, providing a temporary wall or encasement, enclosing the natural opening of the cavity.

The difficulties encountered in filling proximate cavities in

\* Paper read at Northern Ohio Dental Society, June, 1897.

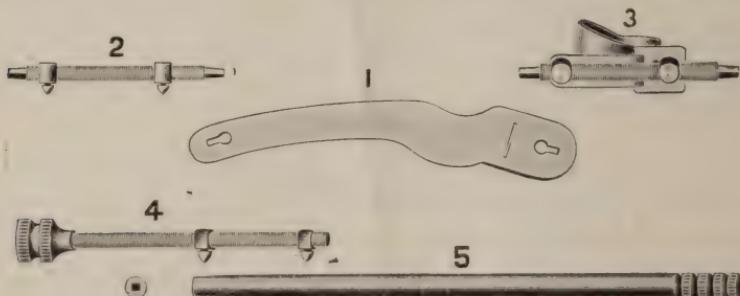
the posterior teeth are: First—The uncertainty of producing exact fullness at the cervical portion of the cavity. Second—Of producing accurate adaptation of the filling material to the cavity walls owing to indirect approach. Third—Of restoring normal contour and thus providing naturalness of knuckling. Fourth—The tediousness of finishing.

The matrix, like other instruments, has had its evolution, and the great variety of devices which have been brought to our attention illustrates that there is a demand for some appliance to assist us in this class of difficulties. The first matrix of which anything is written, was probably that of Dr. Dwinelle, who used a piece of gold plate wedged against a molar to form the anterior face of a large gold filling. This served the function of a matrix and was imitated by others who used the blank ends of separating files, pieces of silver, etc. There are in use two general classes of matrices, viz: the clasp and the band. A good illustration of the clasp is that of Dr. Woodward's matrix which consists of a piece of metal cut and bent in such a way as to serve the purpose intended.

It has a projection which is designed to rest upon the occlusal surface of the adjoining tooth to prevent the matrix from being pushed too far toward the gum and to prevent sliding to right or left. The ends are bent to such a degree as to exert sufficient pressure to throw the face of the matrix away from the tooth sufficiently to clear the cervical margin of the cavity. It is evident that the edge adapted to the cervical margin should pass slightly beyond this point. For this form of matrix polished metal, preferably steel, of say 25 to 30 gauge is employed. After adjustment of the form of the matrix it is well to groove the convex side into little ridges to assist in preventing the slipping of the wooden wedge used to secure it in place. The form of the wedge should be a double one which will permit of adjustment in both directions on being inserted. These matrices are easily made and are very useful. Another form of clasp matrix is the depressed in which the metal has not only been bent to conform to the outline of the original tooth but has also been ground out to allow of adequate fullness at the cavity margins. The matrix of Dr. Jack was of this order. The second-class of matrix is the band. This form of appliance is designed to meet cases more extensive in character than those where the clasp instrument is available as

well as in cases of isolated teeth where the clasp is not indicated. Under this head I will describe the band matrix devised by Dr. Creager. These matrices were made of thin steel of varied lengths. The ends of each strip terminating in a head to be connected with a thumb-screw when placed upon the tooth the ends brought together tightly embracing the tooth. The Brophy matrix is made of this steel and is secured to the tooth by means of the screw and wrench. Dr. Guilford's instrument has the advantage of possessing a lip which is useful in cases where the decay has encroached upon the gum.

Next let us ascertain what are the requirements of a good matrix. A faultless instrument should above all be capable of accurate adaptation to the tooth primarily to insure the exact amount of filling material at the cervical margin and to insure



good contour to the tooth when restored. This accurate adaptation can best be acquired by cutting the band on a curve since the teeth are constricted at their necks. Furthermore, to meet the requirements of adaptation the band should be provided with a lip to conform to the shape of the cavity when the latter extends beyond the gum margin. Second—The matrix should be positive in its action so that when pressure is exerted from within the cavity in the act of filling the same that the form and position of the instrument shall not change. Third—The instrument should be very easy of application. This cannot be if the means of tightening it are difficult and irksome. It should be as simple as the conditions will admit. Fourth—An ideal matrix should be universal in its nature in so far as that is possible. If a large variety of sizes are necessary to meet all cases then there is too much fitting and trying, which means loss of time, and time is not merely money, it is life.

The matrix which I have recently devised was made with the hope of fulfilling the foregoing requirements. Fig. 1 represents the band of German silver about 35 standard gauge. The small end of the band passes through the slot near the large end; the openings at either end of the band are to receive the lugs of screw appliance 2 or 4.

The band when attached to the screw is represented by Fig. 3. Fig. 4 represents the screw to be used on the bicuspids, as in the case of these teeth the wrench can be dispensed with. Fig. 2 is the screw to be used on molars and Fig. 5 is the wrench to adjust the appliance. Figs. 6 and 7 show the matrix in position on the teeth. When using this sort of matrix there is



Fig. 6.

nothing to prevent the use of a wooden wedge if it is desired. The screw, running as it does along the buccal aspect of the teeth,

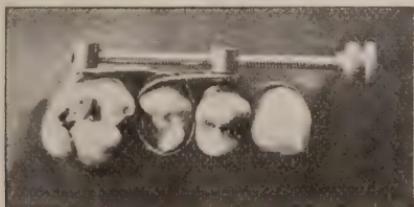


Fig. 7.

enters inside the clamp fixed to a tooth posterior to the tooth operated upon.

The proximal filling of the bicuspids and molars fail more often than those of any other class of cases, and this is largely on account of imperfect adaptation of filling material at cervical border and lateral walls. Any form of matrix that is not positive in action, or absolute in adaptation, will not admit of a perfect operation. The gold or tinfoil, when wedged into the base of

the cavity, will crowd a flimsy temporary wall out and too much filling material will be the result. Hence the importance of a wedge where it can be used and positive action where the wedge cannot be used. It is not within the scope of this paper to elaborate upon the manner of preparing cavities in the class of cases where the matrix is employed, but it may not be out of place to say that the edges of the cavity at the cervical border and the lateral walls ought to be beveled but not so sharply as would be admissible if the cavity were located where the matrix is not called for. The cavity margin should be beveled only to that degree that a foot plugger can readily be adapted to that margin. If more beveling be given the edges than that, the filling material will not be perfectly condensed at those points. With the restoration of a bicuspid or molar tooth when caries is on an approximal surface the knuckling is not the least important consideration. A tooth to be right must be as nearly normal in shape as it is possible to make it. The tooth is then not only better protected against recurrence of decay but it is more useful and will cause less discomfort. When a tooth is filled and not rounded out to its original contour food particles will inevitably be forced in between it and the next tooth and cause much inconvenience. With a good matrix this condition will naturally be avoided, as the tendency from the nature of the flexible band is to give smoothness of curve and naturalness of form when adapted properly to the tooth. With the use of a matrix the tediousness of finishing a filling is much lessened, the surface being already smooth which came in contact with the matrix, all that is left to be done is to polish the edges and the coronal portion and the work is done, provided the filling material has been properly condensed.

The ambition of every operator should be to improve in the excellency of his operations and I believe there is a field for improvement in the manner of treating the class of cavities dealt with in this paper.

## The Teeth and Their Predisposition to Disease.\*

BY GEORGE S. VANN, D.D.S.

It has been affirmed that, by inspection of the teeth, we can ascertain whether the innate constitution is good or bad ; an examination of the teeth and contiguous parts, with the fluids of the mouth, also enables us to determine whether the original constitution has undergone any change. The physical character of the teeth being an external sign of the constitutional organization demands attention, and in each person expresses more or less individuality, known as temperament, of which the teeth, in their arrangement, form, color and size have been considered typical. After describing the distinguishing features of teeth of the different temperaments and the pathological aberrations to which they are consequently most liable, Dr. Vann next considered the different pathological conditions developed in the teeth, as atrophy, necrosis, exostosis, denudation—the latter both chemical and mechanical.

Atrophy is usually constitutional, or congenital in its inception. Necrosis, when the term is applicable to the teeth, signifies death of the entire organ, and may have for its origin a number of predisposing causes. The etiology of exostosis is ambiguous but it is probably to some peculiar constitutional diathesis erosion, it is generally believed, is the result of an over-acid state of the secretions of the labial and buccal mucus glands, superinduced by the constitutional derangements of other functions of the body, back of the immediately acting cause being enamel deficient in vital resistance. The theory of the intimate relation of erosion with the gouty diathesis is held by many. Faulty articulation largely influences mechanical abrasions.

Caries is the most frequent disease of the teeth in civilized nations. Caries attacks the inorganic elements of the teeth, the organic elements being more easily diseased. Caries is due to both external and internal influences. Among the external influences are micro-organisms, acids, disuse, thermal changes and physical agencies. Among the internal influences are malnutrition, morbidity, constitutional impressions and heredity.

\* Abstract of paper read at Alabama Dental Society, April, 1897.

Malnutrition of the entire system naturally involves the teeth, which, when poorly nourished, are less resistive to destructive agents. Morbidity may result from constitutional impurities manifested in the teeth through the nutritive current. Deficient enamel is often the result of diseases suffered by the child during the time of their formation. The teeth being formed in pairs have similar imperfections, others being unaffected. Hereditary influences are important as predisposing the teeth to disease. Inherited malformation and malarrangement of the teeth makes them susceptible to decay. It is this predisposition to weakness that we, as pathologists, have to combat, and when we possess a proper knowledge of preventive dentistry the teeth will be the last to yield to disease, as they are the last to succumb to the powers of decay after death.

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### A Case in Practice.\*

BY J. P. CORLEY, D.D.S.

A LITTLE child, five years old, was brought to the office for examination. Inquiry revealed that two years previous, while suffering with la grippe, the child complained of pains and fever in the left side of the face, which became so severe that she went into convulsions. The physician pronounced it congestion of the liver. A few days later the mother noticed blood on the child's pillow and directed the physician's attention to it. He first examined her lungs and then her mouth, finding an ugly swelling just above the first molar, which was discharging bloody pus. Local applications only were used, cleansing and disinfecting the oral cavity, etc. The child had never recovered her health, and during another attack of grippe the past winter the molar was removed, having become quite loose and annoying.

When the case came into my hands I found that the masseter muscle had attached itself to the alveolar ridge, filling in where soft tissues had sloughed out, also filling the space left by the removal of the tooth. The adhesion of the masseter muscle is so extensive that the patient cannot open the mouth to its normal capacity and the face is becoming shorter on that side

\*From a Paper read at the Alabama Dental Society, April, 1897.

although the adhesion dates but from a few months back. Upon closer examination a small fistula was found passing under and between the buccal and palatine roots of the second molar. A delicate probe passed through this came in contact with the cusps of the second bicuspid, which is just beginning to calcify. The probe passed over the bicuspid and into the antrum. An injection of hydrozone revealed pus.

It was found that the masseter muscle had sloughed considerably from both anterior and posterior origin and had been replaced by cicatricial tissue with but little elasticity. The second molar was almost enveloped by this muscle. Anterior to the second molar there was also a minute fistula with a constant exudation of pus. The left nostril also discharged a very thick viscid excretion. The speculum revealed a catarrhal condition of the Schneiderian membrane. The patient being only five years old and very delicate, to avoid giving pain, I wrapped the platinum point of an electrode with cotton saturated with a 4% solution of cocaine, passed it through and as far up in the fistula as possible. The current was then turned on and in ten minutes the tissues were so anesthetized that further exploration could be made revealing a good deal of denuded bone. The floor of the antrum appeared to be practically gone and its walls denuded. The probe when withdrawn had an extremely offensive odor, and when immersed in hydrozone effervesced freely. The septic condition of the child's system, the extensive adhesion, the germs of the permanent teeth, the denudation of the bony walls of the antrum, and the long standing of the trouble, made it a very complicated case. To be effective, treatment must be heroic. The case having presented a week previous to the Association meeting, Dr. Corley presented for advice and suggestions.

In the discussion which followed the reading of the paper:

DR. J. Y. CRAWFORD (Nashville, Tenn.,) said to Dr. Corley: Take out all dead bone; clean up all the carious teeth very painstakingly, wipe out the cavity (using no bichloride of mercury) and pack with iodoform gauze. When you have got it clean, let it alone.

DR. J. H. CROSSLAND: How often would you syringe it out?

DR. CRAWFORD: You want to get it *clean*, then pack it and let it alone until the patient realizes some discomfort—perhaps three, four, or five days. If you wish you may prescribe a mild carbolized wash.

DR. CROSSLAND: Would you use pyrozone?

DR. CRAWFORD: Not in a case of this kind. The pus-destroyers act with a certain pungency, and the membrane is very sensitive.

DR. CROSSLAND: What conditions indicate packing with iodoform gauze?

DR. CRAWFORD: When there is a good opening, and a tract that you want to heal from the bottom.

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### A Plea for the Dental Laboratory.\*

BY GEORGE H. WILSON, D.D.S., CLEVELAND, O.

THE dental profession is inseparably associated with mechanics, and for that reason it has been questioned whether it should be called a profession or not. That it is acknowledged by the people as one of the learned professions, implies that they expect more of its votaries than mere handicraft. Hence the necessity for colleges with a curriculum of a definite and comprehensive character; one founded upon a broad foundation, so that its alumni may add honor and dignity to the calling, and be able to meet the requirements of an exacting public.

While the profession is considered as a specialty of medicine, it has grown to such proportions that it has several well-defined specialties within its ranks. These are operative, prosthesis, mechanical and orthodontia; and some of these are subdivided. I know that many will take issue with me and will classify the mechanical as only a subdivision of prosthesis and not a distinct department. By prosthesis, we mean the restoring of a lost part by an artificial substitute. This implies knowing the condition of the tissues, whether they are in a healthy condition or not, used as a base of support; and expression, contour and harmony of the associate parts must be restored as well as the lost part. It is the mental training necessary to accomplish this that stamps prosthesis as professional. It follows as a logical sequence that the prothetist shall have the care of the patient from the beginning to the end of the operation. While the mechanical dentist has nothing to do with the patient, he works upon models and

\* Paper read at Northern Ohio Dental Society, June, 1897.

constructs appliances. The mechanical dentist bears the same relation to the prosthetic dentist as the manufacturer of artificial limbs does to the surgeon. The prosthetic dentist may or may not do his own mechanical work. The terms are often confounded, but should be used distinctively.

The practice of our profession being expressed through manual labor, it follows that we must have a place or room in which to perform the work. By common consent, the work performed upon the patient is called operative and the place the operating room; and the work performed independent of the patient, mechanical, and in the mechanical room or laboratory. It is the laboratory for which we wish to make our plea that it is as essential as the operating room and should have as much thought expended upon its arrangement and equipment. Prof. Flagg once said of the old-time dental college laboratory, that "It is a smoking room where the students sometimes do a little plate work." Dr. C. R. Hambly in "How to Build a Practice," says: "The laboratory in most dental offices is a place to avoid. At least it would seem so from the fact that when you call upon another dentist, he is not anxious to have you see that department. This would not be the case if dentists were not in the habit of making the laboratory a dumping place for trash. The work done in the laboratory demands that an amount of attention be given the department equivalent to its importance."

In our large cities it is fast becoming the "proper thing" for many of the leading men to confine themselves to a special line of work; but the large majority in the large cities, and all, with rare exceptions, in the smaller cities and towns, must pursue general practice; so all, with the exception of the specialists in operative dentistry, and its subdivisions, must have as a part of their equipment, a laboratory. That it is of the same importance to every practitioner, is not a fact, but it is true that whatever kind of work a man attempts to do in his laboratory, he should be as well equipped for as the part he considers his principal work; otherwise, he is not equally honest with all of his patients. It is not necessary that every man shall fit up his laboratory as finely as the best one with which he may be acquainted, any more than it would be wisdom for a young man just entering practice with a very limited bank account, fitting up his operating room in a gorgeous and extravagant manner; but the two departments should

harmonize. He should lay a good foundation in each department and add to each or either as his work shall demand. I believe all dentists give the arrangement of their operating room much thought, and desire that such things as they can afford shall be placed and used for the best results. I also believe that it is the very few that give an equal account of thought to the perfecting of the laboratory. With the increased attention given to laboratory work in our colleges, this state of affairs will speedily be corrected, and we shall in the near future have much more discussion upon the laboratory and its procedures.

It is surprising how little outlay of money is necessary to convert the "dumping place for trash" into an orderly and systematized place for business. It is as impossible to map out a model laboratory that could be adopted by all as it would be for one to design an universal operating room, but there are a few general principles that will serve as an aid to good results. In selecting an office, it is to be presumed that the dentist has selected the best possible, all things considered, and that the floor space has been apportioned to the various uses, according to his best judgment. The space allotted to the laboratory is all with which we have to do. This may be large or small; unless it is designed for the use of several persons, it is better that the room should not be a very large one, so that the dominating idea shall be compactness and systematization.

The first thing to be considered will be the walls and floor. The two cardinal points in this will be cleanliness and color. For cleanliness, nothing can equal painted walls and linoleum upon the floor. In color, our reason should govern our choice and not our taste for artistic effect. We should have as strong a light as is consistent with the effect upon the eyes. The preservation of the sight should be paramount to all else with the dentist. There is no color that seems to be less trying upon the eyes than green. It is true that white will give the strongest light, but every school boy knows how trying a snow field is in a strong light, and how acceptable are a pair of colored glasses. We would suggest Nile green as probably the best shade. Green is a combination of the primary colors yellow and blue, and would be yellow-green or blue-green, as the one or the other predominates. Nile green is quite an even mixture of the two primary colors, the yellow slightly predominating, and quite a large amount of white pig-

ment added, giving the peculiar whitish-green. The painted walls have the advantage that they do not so readily afford lodgment for bacteria, are easily washed and therefore, are cleanly. The linoleum is better than the bare floor, because it is a smoother surface, and is easier kept free from dust, is softer to the feet and helps to deaden the sound. My preference is for the plain color; it shows the effect of wear less, and a dropped article is easier found.

The next consideration will be the benches. These may be very simple or elaborate. No matter how simply they are constructed, there are some things that will cost nothing to observe, and others that would be false economy to neglect. The benches should be placed at such a height that the operator can work comfortably, either sitting or standing. For the average height man, three feet and four inches will meet this requirement. They should be about eighteen inches wide, not more than twenty-four inches. They should be one and one-half to two inches thick, of some fine grained hard wood, as free from warpage as possible. Maple or birch will well answer this requirement. The most important bench is the filing bench, where all of the fine work is done. This bench should be placed in the best light possible, with the workman facing the direct light. If the means will permit, a piece of cabinet work will well repay the expense. A very desirable arrangement, is a plain, flat surface four feet long, with a tier of drawers one foot wide at both ends. Ten inches immediately under the bench of the remaining two feet can be used for drawers. This will give four drawers one foot wide by three inches deep, and two drawers two feet wide by two inches deep. One of the long drawers can be used for the gold drawer and the other for all waste. The balance of the space will be for the knees and will be high enough to take in the stool, so that it will be out of the way when not in use. It is well to have several of the drawers lined with metal. Zinc is the most desirable metal for this purpose, it is not very expensive, does not rust, but in the presence of air and moisture it forms a slight film of oxide when the chemical action ceases. It has the valuable property of preventing the formation of rust upon steel. The color is most excellent, being of a dull gray, it is not trying upon the eyes. It is low in the scale as a conductor of heat and electricity; the fusing point is sufficiently high to resist any temperature to which it is

liable to be subjected, and is hard enough to resist undue wear. The arrangement of the gold drawer will require careful thought, there should be a suitable appliance for saving the filings and scrap, there should be convenient places for the various grades of solder, gold and platinum plate.

The plaster and molding benches should be conveniently placed. These may not be very large, twenty-four by eighteen inches each will be large enough. It is best that these should be box covered and open like a piano. It will add much to the cleanliness and neatness if these benches are lined with zinc. Beneath these benches should be drawers for flasks, plaster, investing materials and waste plaster. The soldering and heating bench will next require our attention. This bench should be covered with slate not less than one inch thick. Slate is a non-reflector, a very poor conductor of heat, and practically indestructable. Beneath this bench should be kept the foot-bellows, I would suggest that the medium or large size will be the more profitable to procure, as with a light pressure they will work the blow-pipe and ingot molds, and are capable of furnishing the blast for any of the gas porcelain furnaces, or the crucible furnace. It is well if a canopy and pipe leading to a chimney are placed over this bench, then a little ingenuity will arrange folding doors so that a fume closet can be formed when desired. This will be useful in refining gold by either the dry or humid process, or any work accompanied by disagreeable or dangerous odors or fumes. It will add but little to the expense to have cupboards built under this bench in which the vulcanizer, hot water pans, sterilizer, wrenches, miscellaneous tools and general supplies will have their place. The placing of the individual articles of furniture will be governed by two factors:—light, and the saving of steps while at work.

As it is appropriate, we will quote the last paragraph of the chapter upon "The Laboratory" in the Practice Builder, above referred to: "Attention to the Laboratory and to the details of the work performed there, pays and pays well too. No sensible man will ignore the mechanical side of his practice."

## The Benefits of Combined Effort.\*

BY R. A. RUSH, D.D.S.

THIS is eminently the day of organization; combined men, combined brains, combined capital, combined strength, combined knowledge, constitute the mighty forces that move society from every point. To-day, if never before, "No man liveth unto himself." The organization of dental societies has done more for the advancement and elevation of our profession than all other agencies or influences combined. Yet, notwithstanding the magnificent results of organized professional effort, and notwithstanding the incalculable benefits directly traceable to combined force and interest, there are found men—good men, able men, men of brains and talents and fair success—who gravely tell you they do not attend these meetings for the reason they "do not see any special benefit to be derived therefrom!"

They will not be enlightened, nor will they let their light shine!

Where would dentistry be to-day but for these organizations? We are assembled as representatives of organized effort, the value and potency of which, cannot be over estimated in this age of progress.

The largest measure of successful progress comes from harmonious unity of purpose and force. "It is the click of mind against mind that brings out the brightest intellectual sparks." Onward is ever the watchword. There are other worlds to conquer. No science, no profession, no calling or occupation that ever invoked the energy or ingenuity of man, has yet reached the highest point of possible achievement. However much may have been accomplished in the past, there are still new inventions to be wrought out, new realms to be discovered.

Dentistry has kept pace with the progress of the age. She has stood abreast of the moving column of civilization's ceaseless march, and there is no rest, no halt in this mighty onward movement.

We meet to-day for the interchange of mutual thought and practical experiences. It is exceedingly pleasant at these stop-

\* From Presidential Address Alabama Dental Association, 1897.

ping places along the highway of life to meet and salute our fellow-travelers. Let us greet each other as brethren, feeling that our profession is too grandly broad to furnish occasion for petty jealousies, or any feeling lower than the generous noble rivalry that elevates while it inspires. Your presence here is proof positive that you are in sympathy with the work before you: let us enter upon it with a hartiness and enthusiasm unprecedented in our history.

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### Preliminary Education and Training a Desideratum in Dentistry.\*

BY DR. A. M. ALLEN, GROVE CITY, PA.

AS MEMBERS of one of the most progressive professions of today there are confronting us and demanding solution, two problems of unusual interest. Her whole future character is at stake and upon a satisfactory solution of the difficulty her greatest good depends. They are: how to reasonably control its membership and at the same time increase its efficiency. We recognize the elements of delicacy which enter into these subjects and the difficulties encountered in an unselfish presentation of them.

As this is an age of investigation and general improvement along all lines of human effort, it is not surprising to find within the limits of our chosen profession evidences of such wonderful activity and progressive scientific investigation, research and discovery, resulting in improved methods of application, both plain and practical. So great, indeed, has been the progress of the past decade that she has been attracting the attention and admiration of the entire civilized world.

While the material benefits which must result therefrom to the profession are inestimable, such notoriety is not without its elements of danger, which, if not guarded against by elimination or rendered innocuous, must work to her incalculable injury. This prominence has awakened extreme interest and is attracting toward herself, as a field of employment, vast numbers of young men and women, eager to share in the rewards, utterly regardless of all qualifications natural.

\* Read before the Lake Erie Dental Society, May, 1897.

Whilst it is true that with these conditions has come an increasing demand for her services, having as its source both necessity and expediency, through increasing knowledge of its benefits, and the progressive degeneracy of the teeth themselves, together with the natural increase in our population. Yet it may be admitted to be equally true that the present increase of her membership is out of all reasonable proportion to the demands for her services. One cause of this, which is second to none, is found in the unwarranted, unparalleled and rapid multiplication of dental colleges within the past few years. It is a matter of great reproach to these institutions that no more worthy field of competition has been chosen by them than that of largest enrollment of students, to accomplish which we find them resorting to all manner of means, even to the misrepresentation of truth; a thing in itself most unworthy of them and which justly merits the condemnation of the profession by withholding their support from them.

Our code of ethics occupies a position in our college curriculum inferior to that which its importance demands. A statement which needs no further proof than is found in the nefarious practices and questionable methods, selfishness and unprofessional conduct generally, of those even who have been regularly graduated from these institutions. To this class belong the numerous advertizing men and quacks, better known to the public as "painless dentists," "dental specialists," "dental experts," etc., etc., *ad infinitum*.

Perhaps our colleges have in technical instruction all that their present capacity can maintain, but it is the mind of the writer that these two educational features are inseparable, nor can they with propriety (not to safety) be divorced the one from the other. I ask you, gentlemen, is it any wonder that under existing conditions we find it difficult to persuade young graduates to join our societies, but who as a result of narrow education or abused minds, lest their perverted sense of personal liberty should be outraged, look with suspicion upon any application which, in keeping with their ideas of personal freedom, might destroy their individuality or control their future professional conduct, or perhaps entail upon them the unselfish obligations connected therewith in imparting to others information which they may themselves possess to the mutual advantage of its

members. We think you will all agree with us that here are mistakes and for their correction must we wait indefinitely while dental boards and faculties remain indifferent to the situation, or with varying degrees of success, seeking a solution of the difficulty, employ methods more or less worthy the motives which, if we may be permitted to judge by the past, savor strongly of personal gain rather than professional zeal. There is something we can do ourselves to offset this condition, by vigorous agitation and persistently keeping the subject before these bodies, that moved by a sense of necessity, or perchance by our importunity, as in the story of old, they will arise and give unto us our desire. The situation calls for a higher standard of admission to our colleges, and the future is not without some promise. Already these institutions recognize the existence of a need which is evidenced by efforts more or less effective, on the part of some of them, to apply a remedy, which we regret to say has been most ineffective and disappointing in results, and whether this has been due to an improper diagnosis of the condition and causes leading thereto, or misjudgment in the selection of remedies, remains an open question. Their presumable purpose is, of course, to offset these conditions by the application of remedies suitable. Suitable perhaps for the treatment of some disorders, but for the case in hand how unsuited. In the face of the fact that some of these institutions are largely owned and controlled by self-constituted faculties, places such methods under suspicion of personal vested interests. A deeper purpose is therefore suggested of underlying motives, less beneficent than mercenary, which, if correct, explains much that otherwise must still remain a mystery.

The all-important test applied to the candidate for admittance to our profession through the wide open doors of our colleges today, is not proofs of high scholastic attainment; not proof of worthy character, high culture, strict integrity, and worthy ambition; not the tangible results of careful preliminary training and attainments, nor evidences of a natural ability and mechanical skill capable of indefinite development, and replete with great possibilities, so desirable and indispensably necessary to a successful practice of our specialty. Not upon this, we say, depends the eligibility of the dental student, but rather seemingly upon the ability to meet the expense of a dental college education. Our educational requirements being so low, it is but consequent

that the financial requirement is the only one which seems to give the prospective student any anxiety. Within our limited observation we have never known of a single applicant refused admittance from any cause whatever.

We do not maintain that it is the province of dental colleges to afford a literary education; neither do we believe it their place to assume the preliminary training or preceptorship of students, and enter our protest against it, as that which by the very nature of its manifold duties and diversified elements precludes such a possibility with the limited resources at their command. Yet we do insist that they, as guardians of the entrance into the profession and holding the keys thereof as they do, they should observe greater care in the examination of those allowed to enter, in point of previous education, character and training, and further, we maintain that these standards should be of uniform character in all requirements, and not left as at present to the various ideas, judgments and opinions of those bodies formulating and then adopting them.

We believe a higher admission standard is not only desirable, but imperative, if we would hold our present hard earned position among the leading professions and keep pace with them in rich attainments. Other professions are retrenching and we must do likewise for our own protection at least, if for no more worthy purpose. By what means can we hope to be successful? Certainly no more promising means is offered than by the careful selection of those who enter it. With the dental student little attention is given literary development during the period of college training. In fact, there is reason to doubt the practicability of such at a time when so much that is technical commands and absorbs his time and attention.

If we could conceive of such a thing as a profession without its literature, our plea for a higher literary education among our members would seem unnecessary, but we insist that without our literature all attempts to hold our present position or keep pace with other professions will most miserably fail, and the beautiful and worthy application of the science and art of dentistry, be reduced to the commonplace level of merchandise and trade.

How are we to draw to us those who, when professional culture, training and experience have begun to bear rich practical fruit in their lives, will be ready, able and willing to give to their

colleagues directly and to humanity indirectly, the benefits of their knowledge.

The time to cultivate this disposition and ability, we maintain, is prior to technical instruction and the means to their development is found in our modern literary institutions.

This forms the foundation which is broad enough and deep enough for all future education, both literary and professional. True education develops in a man self-reliance (not selfishness), something he has achieved largely himself, together with a desire to persevere and press forward to still higher degrees of professional attainment. While this instruction without said education, leads a man to depend largely upon the efforts of others and to be satisfied there. Self-sufficiency, egotism and impotence are its natural fruits. Much of the selfishness, unsociability and jealousy, manifest among dentists to-day is traceable to a lack of that liberal education which reveals the moral and sociable nature of man's being and yet does not neglect to teach the consequent responsibility of the individual. How can we best serve the two-fold purpose in us of the Divine Creator, who hath made of one flesh all people who dwell upon the face of the earth—namely, his glory and our enjoyment of him as found in the recognition of and subservience to the eternal principle of the fatherhood of God and universal brotherhood of mankind.

(To be continued.)

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### A Practical Hint.

BY BURT ABELL, ALBION, MICH.

LAY a thin piece of plain paper over roof of patient's mouth and by digital pressure ascertain where mouth is hard, marking outline with a pencil. Remove and cut to pencil line, and you have an exact pattern of tin relief required on the model.

## ALL SORTS.

**Formalin—Cement Root-Canal Filling.**—Powder:

Calc. of sulphur	:	.	.	.	.	.	200
Hydrarg. bichlor.	:	.	.	.	.	.	4
Mix finely.							

## Liquid:

Acid sulphuric	:	.	.	.	.	.	32
Formalin	:	.	.	.	.	.	100
Aq. distil	:	.	.	.	.	.	100

Rub up a few drops of the liquid with sufficient of the powder to form a paste, which, introduced into the previously dried root-canal, solidifies in a few minutes. Fill crown cavity as desired. The small quantity of corrosive sublimate and sulphuric acid in the paste does not have any discolored or corrosive effect on the tooth.—ABRAHAM in *Zahndrztlches Wochenblatt*.

**Soft Rubbers for Tender Gums.**

Among the difficulties attending the adjustment of artificial dentures to the mouth, an inflamed and tender condition of the gums is occasionally present. In such cases the resources of the dentist are strained to produce a denture capable of being worn with some degree of comfort, his best efforts sometimes meeting with disappointment. Hard rubber dentures are found to cause severe friction in some mouths, and it is not uncommon to find a patient going from one practitioner to another, in the hope of finding much-needed relief, the mechanical means of affording which, however, are not numerous. The difficulty may sometimes be overcome by the use of an accurately-fitting eighteen-carat gold plate (eighteen-carat because of its freedom from discoloration), or by a hard rubber case perfectly adapted to the mouth; but in the event of failure by these means, the only available method consists of lining the vulcanite with a soft flexible substance such as soft vulcanized rubber.

Soft vulcanite rubber, even under the most favorable circumstances, will perish after a time if worn in the human mouth—in some cases, when certain pathological conditions are present, it will perish very quickly; they are, however, as near perfection for their purpose as the present state of knowledge allows. Both the Soft Dark Red and the

Vela can be rendered pliable at the ordinary period of vulcanization, viz: seventy-five minutes.

There are two modes of adapting the soft rubber to vulcanite cases. The first lies in packing the soft rubber directly on to the ordinary vulcanite rubber while they are both in the raw state and vulcanizing them together; the second and more reliable consists in vulcanizing the rubbers separately. Exception may be taken to the latter mode on account of the vulcanite being made brittle through the two vulcanizations, but with care few dental rubbers are influenced to any appreciable extent by this.

In the case of lower dentures (and it is in lowers chiefly where the contingency arises) the best process is as follows:

A piece of ordinary modelling wax is first cut to the shape of the intended denture, laid in position on the plaster model, and covered with a layer of tinfoil of the same shape. Over these the teeth are set up on wax in the usual way, and the whole is invested in the flask with the cutting edges of the teeth downwards. When the plaster is set, the layers of wax and tinfoil are removed, after which the reverse is poured. The wax is then boiled out, and the case is packed with vulcanite rubber and vulcanized. The piece thus produced will have sufficient space on the gum or palatal surface for the reception of the soft rubber. Before this is added the vulcanite piece is filed up, except at the edges, which are left rough to obtain a hold for the soft rubber. Before adapting the soft rubber to the denture it is advisable to obtain, where possible, a fresh impression of the gums. This can easily be done by placing a layer of thin modelling wax on the gum surface of the denture and adjusting it to the patient's mouth. Any misplacement of bite is thus avoided, and success is rendered more secure by having a correct impression. Where a second visit from the patient, however, is found impossible, the denture must be proceeded with on the original model. The vulcanite piece is invested in the flask with the cutting edges of the teeth downwards and with the layers of wax and tinfoil in position on it, a new reverse is poured, the wax is boiled out, the soft rubber is added, the flask is closed, and the soft rubber is vulcanized for seventy-five minutes.

In packing the soft rubber, care should be taken to note as far as possible the undulations of the gum, so that the cushion may be thick or thin in places as the conditions may demand, and also to allow for the swelling of the rubber, which in the case of Vela is very considerable. The plaster reverse must be pressed in as tightly as possible without causing fracture. (Wedge flasks are preferable to pin flasks for this class of work). Before vulcanizing, a layer of tinfoil placed between the soft rubber and the reverse will ensure a smooth surface, as, needless to

remark, the soft rubber does not permit of polishing. The finishing of any ragged edges can be effected with a red-hot knife smeared with wax, the seared edges afterwards being cleaned by a piece of cotton wool saturated with chloroform.

Dentures thus lined are generally successful, although the period which the soft rubber will remain impermeable varies with the patient. In some mouths it maintains its virtue for a number of years, while in others renewal every eighteen months or two years is found necessary. It has been demonstrated, however, in many cases, to be the only means of affording satisfactory relief to patients who find hard rubber cases unbearable.—*Ash's Journal.*

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### The Influence of Dental Pain upon Mastication and Nutrition in Children.

I do not think sufficient attention is directed by the dental fraternity to the grave question of the influence of dental pain upon mastication and nutrition in children. While the temporary teeth are developing, erupting, and in position, the alimentary canal and all of its glandular appendages are also undergoing developmental transformation, and influences, such as imperfect mastication, which would have an injurious effect upon the gastric and intestinal digestion in mature organisms, would certainly be fraught with greater danger when influencing organs which are in a developmental state. This in itself is a serious enough matter, aside from local considerations, to warrant the close care of the temporary teeth.—H. H. BURCHARD, *International.*

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### Maxillary Ankylosis.

Rochet describes three cases in which he has operated with success for temporo-maxillary ankylosis. His plan is to expose the neck of the inferior maxilla, from which he removes a wedge-shaped piece. Slips of the masseter muscle—one in front and one behind—are interposed between the resected edges of bones, and sutured to the internal pterygoid muscle. These prevent bony union from taking place. A similar operation was proposed by Helfinch, who proposed the resection of the ankylosed head of the inferior maxilla. Rochet considered this unnecessary, and as it is more tedious than the resection of the neck of the maxilla as performed by him, and besides exposes the facial nerve to danger of injury, he leaves the head of the bone in position, trusting to its future absorption and the establishment of a good working joint.—*Arch. Prov. de Chir.*

### Treatment of Fish Mouths.

We can all cultivate artistic sense. Be sure you have it and the judgment to guide your hand. You find people with fish mouths—teeth depressed and the lowers stand out. By reduction of the approximal surface of the teeth, you can create a space that is quite enough to enable you to pull the teeth back and then get them in proper position. A lady in Chicago came to me with a fish mouth. Her tongue wobbled about and it annoyed her. Another young lady of eighteen had an unhappy expression. I idealized the mouth at once. The corners of the lip drooped—the unhappiness conveyed remained even when she smiled. By means of delicate ligatures, I drew the two centrals down and the outer cusps being very large, I cut them off. Her friends asked her what I had done, the change was so great. So you find by the position of the teeth, you can beautify and give the appearance of health to your patient.—DR. YOUNGER, *Items.*

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### A Few Considerations in the Management of Proximal Cavities in Molars and Bicuspid.

The following is an extract from an article by C. N. Johnson, published in the *Western Dental Journal*:

#### TO GUARD AGAINST FRACTURE OF THE CAVITY WALLS SURROUNDING THE FILLING FROM TOO GREAT LEVERAGE IN MASTICATION.

This relates to the cutting away of all walls rendered weak by decay, or to so protecting them in those exceptional cases where it seems necessary to leave them, that the stress will fall on the filling material instead of on the enamel. There are cases where extensive decay has occurred in which a moderately thin wall must be left, but in all such instances the wall should be beveled well away, and the filling material built over it in such bulk that it is protected from stress.

The question of leverage on these proximal fillings also relates to the form given the filling on the occlusal surface. Wherever the attempt is made to build the filling out at the proximo-occlusal angle so as to reproduce the marginal ridge, it is found that the broad, flat, table-like masticating area admits of too great leverage from the opposing cusp and subjects the filling and walls to an unreasonable degree of stress. To guard against danger from this source, the filling should be sloped from the contact point on the proximal surface towards the occlusal anchorage in such a manner as to present an incline from the highest point between

the cusps down to the immediate contact with the proximating tooth. When pressure in mastication is brought to bear on a filling formed in this way, the force exerted is more nearly in a lateral direction, tending to drive the filling into the cavity against the axial wall instead of tipping it away, as is the tendency when the marginal ridge is reproduced.

Another important consideration in protecting the filling and walls against too great stress relates to the treatment of the occluding tooth.

Close attention should be given to the manner of occlusion of the opposing cusp. If this cusp is too sharp, or if it extends, on closure of the jaws, so far between the cusps of the filled tooth that it necessitates making the filling too thin for strength or presents an element of danger in the tendency to split the tooth, the occluding cusp should be ground down and rounded off. The permanency of the operation and the future safety of the filled tooth will be much enhanced by this procedure, while the occluding tooth, on account of the thick enamel at this point, will not be injured, provided the grinding is done with judgment.

TO PRESERVE THE FORM OF THE INTERPROXIMAL SPACE SO THAT THE  
GUM SEPTUM MAY FILL IT IN A HEALTHY CONDITION.

This feature in the management of proximal cavities carries with it one of the most important considerations connected with the subject. It is a point which is probably more often ignored by the average operator than any of those already mentioned, and the failure to recognize the simplest principles underlying its proper observance, leads to more disastrous results and more continued discomfort to the patient, than is easily imagined by those who have not given the matter careful study. A detailed description of the anatomy and function of the interproximal space is not permissible at this time, but a brief reference to some of the most salient points seems necessary to a proper emphasis of its importance.

The interproximal space is the V-shaped opening between the teeth, having its base at the border of the alveolar process and its apex at the contact point on the proximal surfaces of the teeth. In the living subject, where the conditions are normal, this space is filled with gum tissue, which prevents in large measure the lodgment of deleterious agents between the teeth. When decay takes place and the contact point melts down, the teeth fall together, thus narrowing, and in some instances almost entirely obliterating the space. This results in a crushing out of the gum tissue and the formation of an unhealthy pocket between the gum festoons, into which particles of food find lodgment and decompose, producing discomfort to the patient and grave complications to the periodontal membrane, besides accelerating the process of decay. In the management of proximal cavities, wherever the teeth have dropped together, they should be

separated to their original position and then the filling so built to a contact point that they will be maintained there. From this contact point the filling should be sloped to the gingival margin of the cavity so as to reproduce the original form of the interproximal space. As much attention should be given to the proper form of the contact point and the outline of the space as to any other feature to the operation, and when this is done perfectly the gum tissue will creep up into the space and occupy it in as healthy a condition as it did before decay had taken place.

The principal faults of management as observed among many operators, are manifest in a failure to gain sufficient space to properly build out the filling to form, and to an imperfect recognition of what that form should be. The contact point must be small and rounded, not broad and flat. A broad contact point entails the danger of having particles of food caught between the proximal surfaces of the teeth and held there indefinitely. This soon destroys the gum septum in the interproximal space and creates an unhealthy pocket. Fillings made flat on these surfaces are not only a source of discomfort to the patient but a menace to the permanency of the operation.

#### DETAILS OF CAVITY FORMATION.—THE GINGIVAL WALL.

As already indicated, the margin of this wall should be changed from a curved line to a horizontal base. It will also be noted that there is some extension of the cavity rootwise of the original decay. This is done so that the gingival portion of the filling may be carried well under the free margin of the gum. If there is perfect union between the filling and the tooth along this wall, and the cavity is extended so far rootwise that when the gum fills the interproximal space after the operation, this margin is thereby covered with healthy gum tissue, there will never be a recurrence of decay at that point. Another reason for such extension relates to the manner of decay at the gingival wall. Usually the decay dips into the structure of the tooth involving a deeper penetration rootwise into the dentine than at the enamel margin. This results in a groove along the gingival wall with a ridge of enamel standing more or less sharp and ragged at the cavity margin. It is the habit of some operators to reproduce this form in the preparation of the cavity, but such a procedure is faulty from the fact that if the enamel is higher than the dentine at this point there is grave danger of fracturing it in the insertion of the filling. Enamel unsupported by dentine in a position such as this, where great stress is brought to bear against it from impact upon the filling, is insecure and unreliable. This enamel should be cut away on a level with the deepest portion of decay, and then the entire gingival wall extended into sound, uninjected tissue.

The form of this wall mesio-distally should be such that instead of being grooved, as often advocated, it should be nearly flat, with a slight incline rootwise from the point where the enamel is beveled to the juncture with the axial wall. The bevel of the enamel along this wall need ordinarily not be so great as along the buccal and lingual walls, on account of the absence of lateral violence against this margin after the filling is inserted, and the difficulty of making a perfect filling over a decided bevel at the gingival margin. The juncture of the gingival with the axial wall should be nearly a right angle to insure a flat base for the filling to rest upon, and in the insertion of the filling material it should be solidly condensed into this angle. A filling thus seated will stand great stress without movement. As the angle between the gingival and axial walls approaches the buccal or lingual wall it may be carried slightly into these walls, or what might be called a shallow right-angled groove may be made at these corners for facility in starting the filling and retaining it firmly in position while being built up.

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### Making Dies for Crowns.

I believe I have hit upon something that may be of value to some young man like myself, who has to find out many things by hard knocks. In making dies for crowns it is often difficult to obtain a dead and counter-die of Mellotte's metal, because the surface of the cold die, especially the cusps or any small prominent part of the male die, is very liable to fuse when the melted metal for the female die is poured upon it. This happens even when the male die has been well carbonized and is kept cold by standing upon a piece of ice while the melted metal is being poured, and the latter is made only hot enough to barely flow. Having used the utmost care in doing this I find it impossible to separate the dies when cold without breaking.

To overcome this difficulty completely I burnish a piece of tin-foil over the male die, and leaving this upon same pour the metal for the female die upon it. When cold the two dies will fall apart, and if the foil has been well adapted to the male die the female die will be sharp and as good for all practical purposes as if it had been poured directly upon the male die. The tin-foil prevents the surface of the male die from fusing, providing it be cold before the female die is poured upon it.

My observation may not be new, but I have never heard of it before, and found it out only after much difficulty with other methods in popular use.—W. B. FAHNESTOCK, *Dental Digest*.

### Societies.

No man who ever attended a State medical society meeting could go home and truthfully say that it had not well repaid him for the sacrifice of the little time and money required. It is only those who never attend these meetings who have the audacity, and show ignorance enough to say that it is time and money thrown away. It does pay. It broadens one's views to meet others and hear discussed subjects that are of importance to every medical man. It creates to one an ambition to learn, to study, to progress, for these meetings show to even the most advanced that there are others who know more about some things than he does himself. It pulls one out of the rut that he has allowed himself to get in.—*Western Med. Review.*

[This is just as true of dental societies.—ED.]

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### Severe Case of Hemorrhage.

Monday, September 21st, I extracted several teeth for a young man age twenty; and having had severe hemorrhage after previous extraction, I proceeded to at once pack the alveoli with cotton and tannin; the bleeding stopped at once and remained all right until the following Saturday morning, when one of the right superior bicuspids started bleeding; packed with cotton in tannin and anti-pyrin solution. In the evening bleeding occurred from the alveolus of the opposite tooth, and in spite of all I could do, with the help of the family physician, who administered the different hemostatics and tonics, it bled excessively, with slight intermissions, for more than a fortnight. It left him very weak for some time, but otherwise no ill effects. A brother dentist had a similar time with the patient's brother last year.—T. L. HALLETT, *Dom. Journal.*

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### Submarine Gold Fillings.

From an article in the *Items of Interest* by William Herbst, we abstract as follows: Filling with gold in the presence of moisture is old, but it is new that we may use gold for filling teeth admitting moisture, and obtain perfect results.

The gold which can be used under moisture, is a chemically pure foil, very soft, and of the thickness of the ordinary number sixty foil, but without the unyielding and stiff properties usually found in foils of that thickness. This gold is entirely non-cohesive, when not annealed.

The cavities in the approximal surfaces of teeth may be filled under moisture, as well as those in the occlusal surfaces, but the walls must be comparatively strong. Contour fillings, however, as for example, the restoration of the lost corners of incisors and cuspids, are impracticable. Fillings which must have a convex surface when finished, are difficult, and I will publish my experience in this class of work later; for the present, I will only speak of fillings, which I am positive may be inserted by this method more easily and safely under water, than with the aid of the rubber dam, and which are even more easily introduced than tin-gold fillings.

The instruments required are a tin-gold plunger, slightly bent instrument; also a chisel shaped, narrow instrument, and lastly two excavators, one a hatchet and the other a hoe. None of these, however, should be sharp enough to cut or pierce the gold, with the exception of the tin-gold plunger, which should be serrated. The edges of the instruments should be removed with sand paper.

The gold may be picked up on the points of the instruments which may be rubbed on sand paper occasionally to facilitate adhesion. The gold is preferably kept on a wooden plate and moistened with water, which makes the manipulation easier. Care should be taken that the instruments do not become too blunt, which may be obviated by rubbing the sides as well as the cutting edges on the sand paper.

In addition to the instruments named above, we also need a few round stone or steel instruments, to use with the dental engine.

It would be wise to select for the first experiment, a cavity in the grinding surface of a tooth out of the mouth, by which the value of the method may be tested. The method mainly consists of a system of wedging all the separate pieces of gold along the walls; consequently the points of the instruments should be smooth with the exception of the tin-gold plunger. With the assistance of this last instrument, the cavity is filled with the submarine gold, each layer being condensed with the wedge shaped instruments. In deep cavities, the first layer may be condensed by means of the rotation method, and tin-gold may be used as a base, if desired. It is important that the filling should be made as high as required to extend beyond the margin of the cavity at the point at which the filling is begun, and this rule is followed as the filling is gradually made to approach the opposite wall. All depressions made by the instruments, are to be filled by the addition of gold. The chisel shaped instrument should be forced into the filling, and the space thus made filled by adding more gold, which should be continued until completed.

Some times it may occur that the gold will not remain in these spaces made by the instrument. The fault usually lies in the fact that the piece

used is too large, consequently a smaller piece may be tried, or a depression can be made elsewhere, lateral pressure thus closing the first space, and the second space may be filled with gold. The method is much simplified if the gold, during its introduction, is held in place by an assistant. When the filling is completed, the surface must be perfectly condensed by means of agate or steel burnishers in the engine, and is then polished.

Fissures in the grinding surfaces of the teeth, are filled with the wedge shaped instrument only. They are packed with gold from the posterior to the anterior portions of the cavity. To complete the filling, the wedge shaped instrument is pressed into the gold near the wall, and the hole thus made is filled with gold again, which process is repeated until the wedge shaped instrument can not be pressed into the filling at any point.

In cavities in the approximal surfaces, great care is needed in the adjustment of the matrix, as well as in the packing the gold against the cervical margins. These fillings are finished in the manner as those in the grinding surfaces.

Old gold filling, which, through wear, flaking off or caries, have become defective, may be readily repaired with submarine gold. Even old amalgam fillings, the edges of which have become defective, may be repaired with submarine gold. In such cases, bur out the imperfections along the edges, and the cavities thus formed may be filled as fissure cavities would be, and when completed, the result is most satisfactory.

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### Crowning a Fractured Tooth.

A young lady called at my office recently, presenting for examination the root of the right superior lateral incisor, the crown of which had just been broken off at the margin of the gum by "the kick of a shotgun." The posterior third of the root was broken loose an eighth of an inch under the process.

After anesthetizing and removing the live pulp and loose slab, I stopped the hemorrhage and made undercuts to hold a filling, where slab had been removed.

The pulp canal was enlarged and a round silver wire inserted. After applying a 10% solution of cocaine to the gum, a thin German-silver matrix was forced under the gum and quick setting alloy burnished into the cavity, contouring root to its normal condition. After removing matrix and pin the patient was dismissed until the following appointment, when a Logan crown was set with prospects of good results.—B. L. THORPE, in *Items*.

### Root Perforation : A New Method of Treatment.

My first case of traumatic perforation occurred about six years ago, in a right upper lateral incisor, which I was called upon to crown. The root had been filled some years before with gutta-percha. This I drilled out to what I judged to be about three-fourths the depth of the root, which, at this point, seemed to take a bend to the left. Having reamed out the canal, and fearing it was not quite deep enough to accommodate the pin, I unwisely proceeded to drill the canal a little deeper. I had almost succeeded to my satisfaction, when the patient showed sudden signs of pain, and on withdrawing the drill, wiping out the canal, I found traces of blood. I immediately dried out the canal and carefully dressed it with oil of cloves. Next day the case showed a distinct swelling on the gum over the seat of the perforation, but within three days this swelling had entirely disappeared and all irritation had subsided. At a subsequent appointment I removed the dressing, dried the canal out thoroughly, and proceeded to seal the perforation in the following manner:

Having mixed copper amalgam quite thin I gently carried a small portion of it to the apex with a blunt-pointed instrument rounded at the end—in fact, an old excavator with the point broken off. The amalgam was gently spread round the upper portion of the canal, a rotary motion being used to carry it evenly around the interior. No pain was caused by this proceeding, but the patient was just aware of a very slight sensation while it was being done; this sensation subsided when the point was withdrawn. The interior of the cavity being thus lined, its depth was not seriously lessened. The patient was then dismissed till the following day, when the amalgam had hardened thoroughly, and at the next sitting a Richmond crown was set, and has done good service up to the present time. . . . .

In the treatment of carious perforation—the second variety—I have followed similar lines as shown in the following cases :

Mr. H. called about three years ago to have some teeth filled. On examination the left upper lateral crown was missing and the root almost entirely covered by gum. I proposed he should have it crowned, but was informed this had been twice done about two years before, and that each crown had failed within a few days of its insertion. This had proved so discouraging to the patient that he decided to let it alone. About a year ago he again presented himself and requested an effort should be made to crown.

A thirty-per-cent. solution of cocaine was applied to the hernia-like knuckle of gum occupying the face of the root, and when this had been

removed as completely as was deemed possible, a long, funnel-shaped opening was seen. This was washed out, and when bleeding had ceased was packed with cotton dipped in oil of cloves and hydronaphthol and lightly sealed with temporary gutta-percha. In twenty-four hours this dressing was taken out and the walls of the root explored; these were found to be extensively softened and perforated on the left side well below the gum, which projected through the space. At the apex—sealed at previous crownings—about one-eighth of an inch of the normal canal was patent, the remainder being hollowed out as above described. The carious dentine was now carefully removed by a spoon excavator and the perforation unavoidably enlarged, till, on the left side, it extended from the gum margin towards the apex for fully a third of the root's length, and a new perforation of a like size was made on the right side: thus of the gingival circumference only the lingual and the labial parts remained. This sacrifice, however, brought me to comparatively healthy dentine. The cavity was packed as before and the patient dismissed. At the third visit all traces of decay were removed and the interior of the root roughened for retainage. After careful drying out the soft tissues surrounding the perforation were lightly touched with carbolic acid to prevent ingress of serum and again dried with hot air; copper amalgam was made very thin and plastic, and a little of it gently placed over the perforations and spread over them and their adjacent dentine edges with a round, straight instrument used with a rotary and rolling motion. In the apex I now placed a smooth iron post, which had been thinly coated with wax,—it was merely heated, plunged in wax, and then cooled—and round it tamped copper amalgam till the canal was full. Next day this post was heated, the wax melted, and the pin almost dropped out. I then mounted a Richmond crown, which during the three years which have elapsed I have repeatedly seen, and which the patient assures me has never given a moment's trouble or discomfort.

In the spring of 1894, Mrs. M. presented herself at my office. An examination disclosed the right lower first molar abscessed, and with a small pulvroid projection of gum growing from the bifurcation of the roots and projecting into the large carious cavity of the crown. Inquiry elicited that the tooth had been crowned some time before she came to me, but the crown had only remained on a short time, and had given rise to almost constant pain till it, fortunately, came off and gave her relief.

Having cleaned out the cavity as thoroughly as possible, I anæsthetized the polypoid portion of gum and cut it off. The decay around the margin of the cavity was thoroughly removed with large spoon-shaped excavators. Free hemorrhage ensued and was checked with hot water as in other cases. A slight dressing of cloves and hydronaphthol was next

applied, and the patient dismissed till the following day. After the roots had been treated and filled, the perforation was touched with carbolic acid, thoroughly dried, and soft copper amalgam gently plastered over the whole interior of the cavity, anchorage being got by slight undercutting at the sides. A gold crown was mounted on the root, and has since done excellent work.

The result in cases formerly deemed most uncertain or even hopeless has indeed been such, that time and a careful trial of this method seem to me to be alone needed to prove that this question of perforation has been practically solved.—JOHN GIRDWOOD in *International Journal*.

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### How to Take Care of the Eyes.

Do not read or study by a poor light. Let the illumination come from the side, slightly back, but not from in front. Do not read or study long at a time while suffering great bodily fatigue or during recovery from illness. Do not read while lying down. Do not use the eyes too long at near work, but when weary give them periods of rest and a bath in cool water with friction or massage. During study avoid the stooping position, or whatever tends to produce congestion in the head and face. Select books printed on good, but not glazed paper, and well printed. As you value your eyes avoid the use of alcohol and tobacco. Take much exercise in the open air. Indoor life ruins more eyes than all the doctors can ever cure. Life at the seaside is favorable to good sight. Outdoor life in a wooded country also favors the eyes. The green grass and green landscape is good for the eyes. As you value your eyes, so keep your body strong. The eyes weaken as the body weakens. The eyes are the most precious of our sense organs, and once injured can never be quite as good as before.—*Public Health Jour.*

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### A Case in Practice.

A patient whom I have been treating had the pulps of both bicuspids of the right lower jaw killed, and the pulp canals filled with gutta-percha points, some seven years ago. The cavities in the teeth were also filled at the same time. These fillings have come out on cutting away the carious tissue to put in fresh fillings, the patient showed signs of extreme sensitiveness when the neck of the first bicuspid was touched, more especially on the side approximate to the canine. This side seemed perfectly healthy. This was tested in several ways with probe, and heat, and

cold. The other part of the tooth showed no sign of tenderness, and excavation of the cavity was completed without any pain. The gum had receded very slightly from the neck of the tooth. Application of nitrate of silver has given complete relief. Patient is a female, aged 35. In this case it would seem as if the nerves of the peridental ligament were continuous with the sense tissues (fibrils) in the dentine through the cementum. It may be worth while noting that in killing the pulp of a molar tooth for this patient three different applications of fibre had to be made, a small piece of pulp being removed before the second and third applications. She said that had to be done to several of her teeth.—J. C. DOUGLAS, *Dental Record*.

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### Discussion on Cataphoresis.

The following discussions printed in *Items of Interest*, took place at a meeting of the Second District Dental Society, New York :

DR. FERRIS. I wish to speak of a case successfully treated with the cataphoric apparatus. The patient came into my office in the morning, with a great deal of pain in a first bicuspid in the lower jaw. There was quite a large filling in the posterior approximal surface, which I removed. I applied an anodyne dressing, and the patient went out of the office. In about an hour she came back and said the twelfth year molar was aching. I found a filling in the masticating surface. I removed it and treated it in the same manner. Both teeth had been devitalized. She went home, but in the afternoon came in again and reported that the molar had stopped aching, but that the bicuspid had commenced again and was aching furiously. With my cataphoric apparatus I applied about one-fifth of one per cent. aqueous solution of tincture of iodine to the gum for about fifteen minutes under the bicuspid and under the molar. In about ten minutes after the application the pain ceased and she has had no symptoms of pain since.

DR. VAN WOERT. I advise Dr. Ferris not to apply such treatment for fifteen minutes again.

DR. FERRIS. Why not?

DR. VAN WOERT. Because you will produce a bad blister and perhaps sloughing, and you *may* have the kind of trouble which one of our members had—a law suit.

DR. RUSSELL. I would like a report as to the failure of cataphoresis. I have heard of cases where it was applied to live pulps, and the patients commenced to dance.

DR. EMERSON. I use my cataphoric apparatus quite extensively.

I have taken out pulps alive and had no failures except in two instances. In these, one of the teeth was filled with amalgam which I think prevented my medicament from entering the tooth, and in the other case the current did not go where I wanted to go. My experience has been that in twenty minutes, certainly in half an hour, I can anesthetize the pulp so that I can take it out without pain. I rarely need more than ten minutes to desensitize dentine. I used iodine once for about four minutes, and it appeared to have burned a hole in the gum. Now I never use it over two minutes. I get good results in two minutes with one-fifth of a milliampere and about six cells of the battery.

DR. HYATT. I have used the cataphoric apparatus and would not be without one. I would rather part with my dental engine than with my battery. I have had a great many successful cases; but as we have all heard of the successful cases I will report one of the failures. I had a patient twelve years old. The tooth was a sixth-year right superior molar. It was one of those where the crown is not perfectly formed. I imagine it would come under the name of Hutchinson's notched teeth. I put on the rubber dam and applied cataphoresis in the way that I had heretofore applied it with almost monotonous success. This time I continued the current for twelve minutes, but when I started to excavate I could not do a thing. The tears ran down the little girl's face. I could not apply more than two-fifths of one milliampere without causing her intense agony. I started with two cells. Sometimes when a patient cannot endure two cells, he can endure six—why, I do not know. I find that the smaller voltage I have, the better success. I kept the current on in this case until an hour was consumed, but I could not excavate that tooth in any way with the finest or sharpest burs I had, or with hand instruments. I heated it with hot air and painted it with four or five coats of carbolized resin, to which I am partial, and told the patient I would make an attempt again in three months. At the end of three or four months, I am sometimes able to excavate where I often cannot do it in the first instance. That is the first failure I have had in about six months' use of the cataphoric apparatus.

DR. VAN WOERT. There is difficulty sometimes in damming three or four teeth for cataphoric treatment. I select a crown impression tray and take an impression where I want to dam the teeth; remove it, cool it, take the modelling compound from the tray and carve away the top of the impression. When replaced in the mouth this leaves a well around the cavities, and then I put the saliva pump in the mouth and relieve overflow of saliva. I use this in preference to napkins, where I cannot use the dam. The adaptation is so close that there is seldom any leakage. This is applicable to cataphoresis and all other treatments.

DR. RHEIN. The result of my experience with cataphoresis up to the present time makes me to say most emphatically that there is no excuse for any failure in cataphoresis, if it is feasible to overcome leakage into the surrounding tissues, or through some filling in the tooth. I have no record of any cases within a number of months where this has not been possible. I never think of doing any dental operation without adjusting the rubber dam, and I have no knowledge of any place on a live tooth, where it is not practicable to adjust the rubber dam. Having adjusted it, frequently leaks occur around the rubber dam that we are not aware of at first. Within the last few days I picked up a very good suggestion, but I do not remember just now to whom to give the credit for it, I saw it in one of the journals. It is to use soft oxyphosphate on the rubber, up around the margin of the gum. This will prevent leakage. Very frequently leakage will extend to an adjoining tooth that seems to be absolutely unimpaired, with perfect enamel and no sign of any cavity. Through some peculiarity of the structure, the current will have an affinity for that tooth and will travel in that direction. Although I may have the dam over four or six teeth, when I am ready to cataphorize the tooth, I take an extra piece of rubber and isolate that tooth to prevent leakage.

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### Electricity in Alveolar Inflammations.

In this journal I have called attention to the use of high-voltage continuous currents in treating inflammations about the jaws, and described a convenient form of generator. While testing this form of current I have also built a number of generators for producing the Tesla or high-frequency current, constructing them in accordance with the ideas of Tesla, Hertz, and Lodge, and as this form of current seems to be equally efficient and more certainly generated, a brief description of a very simple form of apparatus will be here described, which, though it contains no new ideas, is convenient in practical use, and may help some one who wishes to experiment in this direction.

First, the position of the resistance is of importance. On each main of the one-hundred-and-ten-volt Edison street circuit I place a carbon resistance of a sufficient number of ohms to allow one, two, three, or four amperes of current to pass. This resistance is placed on the wall, out of reach of danger from short circuit, which, as in using this current in cataphoresis, is to be carefully guarded against.

The wires from this permanent resistance are brought to another variable resistance near the operator's chair. The wires leading from this second resistance are connected with the terminals of the primary of

a second coil with the usual spark gap. In the secondary of this coil the patient is placed. Enough current may be passed through his body to feebly excite a Crookes tube in series with him without pain. Tesla showed some years ago that an amperage great enough to produce serious consequences with a slow interruption, was harmless and painless if the interruption were rapid, so that no one need hesitate to use such a current in dentistry, if arranged as herein described, provided the patient takes hold of the terminals before the current starts and holds them until it stops. The mechanism for stopping the current is a foot-switch, which is placed in the main circuit, between the patient and the resistances. If this matter proves of sufficient interest, I shall be glad to figure more perfect, though more complicated, apparatus for the purpose.—WM. ROLLINS, *International*.

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### The Comparative Value of Eucain and Cocain as Local Anæsthetics.

The following results obtained from experiments undertaken for the purpose of studying the action of eucain and cocain : 1. The injection of cocain is not at all painful, while that of eucain causes a certain smarting sensation. 2. Eucain is a vaso-dilator, while cocain is a vaso-constrictor ; with the former the field of operation is clouded by the blood. 3. Eucain is certainly an excellent analgesic, although in deep operations the perception of pain seems to be somewhat more distinct than with cocain. 4. In an operation with cocain, anaesthesia is still complete an hour and ten minutes after the operation, while the eucain it disappears after forty-five minutes.

If, said M. Reclus, eucain was less toxic than cocain, it was still to be preferred in spite of these slight inconveniences. M. Pouchet, he said, had made sixty experiments on different animals. He had recognized that the toxicity of eucain was nearly as great as that of cocain. He preferred the latter, which presented warning symptoms of intoxication, to eucain, which suddenly overcame the patient without any premonitory symptoms.—M. RECLUS, *Presse Medicale*.

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### Cataphoresis.

I do not have very much use for cataphoresis in my office and I fill a great many teeth. I have the instrument for cataphoresis in my office and have experimented with it and it is one of the handiest things I ever had in my office, and I thought before I got it I would want to use it,

but now I have it there staring me in the face I very seldom use it. However, where there is a patient with very sensitive teeth, there is no doubt we can bring about an obtunding of the dentine with it, but I tell you gentlemen, the "chickens are coming home to roost" in Chicago! Dead pulps are showing up! A great deal of mischief is being done with cataphoresis to-day! I believe it is advisable for every man, if he has a large practice among sensitive teeth to have cataphoresis ready at hand. We once in a while come across a sensitive tooth that is so exceptionally so, and I would take all the chances of killing all the pulps in preparing that cavity. But I use cataphoresis with one thing in mind, that I may possibly and will probably destroy that pulp. There is just another point in this connection; while it does not ordinarily cause such a great amount of pain to cut into some dentine if you do not approach the pulp, the minute you are beginning to approach the pulp you are warned by the patient, and in the preparation of a cavity, where you have not used cataphoresis, you are not likely to go near the pulp. I would rather prepare a cavity on intelligent lines, do it in the mouth of the patient, than to take that same tooth and prepare it in a plaster model after extraction and I am not inhuman or brutal either, because in the former case I have something to guide me as to the extent to which I may carry my excavation.—DR. JOHNSON, *Western Journal*.

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### Danger Signals in Cataphoresis.

Cataphoresis has passed the experimental stage so far as theory is concerned. The electric current *will* carry medicaments through tissue. Sensitive dentin *can* be obtunded and excavated painlessly. Pulps *can* be completely anesthetized and removed without pain.

These are known facts. There are others unknown to most of us, as for instance, in using it for sensitive dentin may we not injure the pulp by too high voltage, or in ways we know nothing of? We must remember that the pulp has not the powers of recuperation possessed by most of the soft tissues. What voltage is necessary to injure tissue?

Some of these machines furnish as high as sixty volts, which some claim will break up cell life and thus destroy tissue. Of course the makers claim this amount of current is to be used only in obtunding pulp for removal, but right here you must recollect that the average dentist is not an electrician, and if he attempts to use the current on sensitive dentin, and the most minute leak is present, the tooth remains unaffected. He turns on more and more until he is using full strength of machine and the tissues surrounding the tooth are being ruined. Then how do you know whether you have a leakage or not?

Will the current as used properly destroy germs, or may not septic matter be carried into parts beyond the tooth?

Some of the accidents mentioned have happened and have been reported. Here is another one of great interest and importance. A dentist in this city made an application of arsenic in the usual manner, and at next sitting attempted to remove pulp, but he found it highly sensitive. To hasten matters he applied cocaine with the current and removed the pulp painlessly, but at the next sitting he found the arsenic had been inducted into tissue beyond the tooth. Here was the devil to pay and no funds. Don't say he should have known better—anyone might have done the same thing thoughtlessly.

Never use cataphoresis in a tooth in which any arsenical compound or other injurious drugs have been placed, as the current will carry them through and cause untold trouble.

If pulps die or accidents happen report them promptly to the journals and thus keep others from like errors. Study up on this subject. Act conservatively and report successes and failures.—F. F. FLETCHER in *Dental Digest*.

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### Retaining Deciduous Teeth.

Where a deciduous tooth is sound and firm in its socket, it has been my practice to allow it to remain, unless a successor has appeared, or is about to appear beside or near it. I have seen some cases where such teeth were extracted, and the expected successors failed to appear for several years, if at all. I consider a deciduous tooth which is sound and firm, as good for mastication as a permanent one. Very few of our patients can distinguish between them.

As a permanent lateral incisor is often suppressed, I should never think of extracting a deciduous lateral unless its successor had appeared, or showed by the fullness of the gum that it was sure to appear.

The rule which I often teach students in Orthodontia is, "Never extract a deciduous tooth unless it deflects its successor, or otherwise is the cause of an incurable abscess."—C. L. GODDARD, in *Items of Interest*.

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### Constitutional Treatment as an Agent in Developing Perfect Teeth.

We all concede that the sixth-year molar holds a very important position, erupting, as it does, nearly a year before the temporary teeth are shed. It has many duties to perform: to keep correct the occlusion

of the jaws, do the masticating till the temporary set are shed and replaced by the permanent ones, and to keep the face in shape.

When a case is presented to us with the sixth-year molar mostly gone, is it not supposable that those following may take the same course unless some preventive treatment is followed out? Is it not our duty to prescribe when we see unmistakable signs of the lack of inorganic matter in the teeth?—From the 6th to the 17th year the growth of the body is very rapid, and as the bone of the body has the most exercise it absorbs most of the bone-making element from the food, and leaves the teeth in poverty row because of the lack of building material. The teeth also should be exercised, such as biting on tough substances, coarse food, etc.

As a developing agent I have used the syrup of lacto-phosphate of lime more than anything else; also hypophosphites in milk, or the lime salts combined with other agents as the circumstances require.—J. M. DUNN, *Stom. Gazette.*

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### Gold Plating by Dipping.

The following formula, which appears in the *Zeit. Angew. Mikrosk.*, has been recommended: Crystallized pyro-phosphate of sodium, 80 Gm.; hydrocyanic acid (12 per cent.) 8 Gm.; and crystallized gold chloride, 2 Gm., are dissolved successively in one litre of distilled water, and heated to boiling. The object to be plated is well cleansed, attached to a copper wire, and immersed in the boiling fluid.—*Amer. Druggist.*

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### How to Make Cusps.

Take a couple of natural teeth and invest them in a section of brass tubing, a right and left, articulating surface protruding about one-eighth of an inch, take an impression of them in some modelling composition, and fill in with plaster. These cusps are susceptible to change,—you can do anything with them that you can with the Hollingsworth and more. After you have them in place on your model, you can articulate it, take the impression in moldine, and swage up your articulating surfaces.

Another way of using these teeth if you want a good counter-die the same as the die-plate, only a great deal better, is to take a piece of brass bar rod, cut off the size you want, put it into the rubber ring, and pour in fusible metal while it is hot; after it is hardened you will get a counter-die which is absolutely perfect, and you can work on that eighteen- or twenty-carat gold without seriously marring your die.—DR. RELYEA, *International.*

## BRIEFS.

**How a Bicuspid is Weakened.**—Nothing so weakens a lower bicuspid as free cutting on its distal aspect.—*Dr. Jack, International.*

**Warm Solution.**—If the solution of cocaine is warmed before using, its anesthetic effect is more rapid, more intense and more lasting.—*Lanceet Clinic.*

**Platinum** has been drawn into smooth wire so fine that it could not be distinguished by the naked eye, even when stretched across a piece of white cardboard.

**Cerium Nitrate as a Bactericide.**—It is said that in proportion of one part to a thousand cerium nitrate is a powerful batericide and it is proposed to introduce it into therapeutics.

**To Polish Aluminum.**—Gray or unsightly aluminum may be restored to its white color by washing with a mixture of 30 gm. of borax, dissolved in 1000 gm. of water, with a few drops of ammonia added.—*Amer. Druggist.*

**Nature's Restorer.**—While admitting that some sleep too much, the majority get less than they need. Sleep should be taken with great regularity, and be free from all disturbance. Sleepless nights are often spent because of being too irritable from fatigue to rest.—*W. H. Maxon.*

**To Remove Tin-Foil** which has been applied to the face of the cast, but which now adheres to the plate. This is done by immersing the plate in a solution of nitric acid and water, one-third acid to three-fourths water, and permitting it to remain in the solution for ten or fifteen minutei.—*T. F. Chupein, Office and Lab.*

**Gold Crowns.**—I wish to say with reference to gold showing, that some people like it and some do not; if a patient insists upon having a gold cap, I feel it is my duty to make it. I try to persuade them to have a porcelain facing; but if they like the gold, and their friends like it, it is their business and not mine.—*Dr. Northrup, International.*

**To Refit Rubber Dentures.**—Scrape or file the palatal surface of the old plate; use mixture of thin plaster and replace the plate in the mouth; close teeth tightly together with plate in place; varnish the impression as usual; flask, and pour the impression; separate the flask; remove thin coat of plaster; then roughen the plate and pack enough rubber to fill the space.—*Dominion.*

**Chloro-Percha as an Insulator.**—Before setting crowns or bridges on hypersensitive teeth, it will be found that thoroughly coating the entire surface of the affected teeth with a film of chloro-percha will prevent the pain experienced from thermal changes in these teeth after being crowned, and will also prevent the pain produced by the acid in the cement while setting the crown.—*D. W. Dillehay, British Journal.*

**Lockjaw Caused by a Tooth**—Dr. Sache (*Centralblf. Chir.*, 1896, No. 40) reports a case of lockjaw which for four years baffled the skill of several physicians. Dr. Sache found the right superior third molar projected externally in a horizontal position pressing against the internal pterygoid muscle so that the patient was unable to open the mouth. Eight weeks after the extraction of tooth patient could open jaws normally.

**A Bad Habit.**—One of the most pernicious practices prevailing in this country, says *Modern Medicine*, and, to a large extent, in all civilized countries, is the habit of medicine-taking. Many people are addicted to the habit of swallowing a drug of some sort for the relief of every physical discomfort which they may happen to experience, without any attempt to remove the cause of the disorder by correcting faulty habits of life.

**Denzel's Hemostatic Tincture.**—Bibring prepares this as follows: After mixing 10 grams pulverized ergot, 20 grams alcohol and 2 grams sulphuric acid, he pours over it 500 grams boiling water and reduces by boiling to 200 grams. Then he adds 2 grams of calcium carbonate, submits the liquid to pressure, evaporates to 70 grams and adds 30 grams alcohol and 3 drops essence of ginger, and sets aside to settle, and filters.—*Pharm. Ztng., Dental Review.*

**Ordinance against Cocain.**—It is reported that the victims of the cocain habit have become so numerous in Chicago that an ordinance has been introduced prohibiting the sale of remedies for catarrh and other diseases, which contain cocain. In the last two months over forty victims of the drug have applied in the police courts and elsewhere. Several of them have been well-known men and women, who say they were brought to their present condition by using catarrh cures.

**Educate the People.**—(1) Dental education for the people is a necessity; (2) the physician and the teacher must be educated, that they may use their great influence intelligently in the homes and schools; (3) the public must be reached, whether by means of pamphlets or short newspaper articles, in language easily understood. The education must come from our dental societies to be authoritative, and must in no sense advertise any one in particular.—*G. S. Martin, Dominion Journal.*

**How to Prepare a Cavity in an Artificial Tooth.**—Take a small size corundum wheel and grind a cavity the size and shape you want it, then take a small discarded fissure drill and harden as hard as possible, and sharpen to a blade point by grinding on two sides, moisten cavity with campho-phenique, and by frequently sharpening the drill on an oil stone can drill retaining pits any size and depth you wish in a very few minutes without fracturing the tooth.—*S. A. Whedon, Review.*

**Bad Breath.**—For fetid breath prescribe the following:

B	Tinct. Myrrhæ . . . . .	2 drachms.
	Kennedy's Dark Pinus Canadensis	1 drachm.
	Sodii Boratis . . . . .	12 grains.
	Listerine (Lambert) . . . . .	3 ounces.
	Aquæ Dist. . . . .	2 ounces.
M.	Sig.: Use as mouth wash three times daily.	— <i>Med. Brief.</i>

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### New Publications.

A PRACTICAL TREATISE ON MECHANICAL DENTISTRY. By Jos. Richardson, M.D., D.D.S. Seventh edition, revised, enlarged and edited by George W. Warren, D.D.S., chief of the clinical staff, Pennsylvania College of Dental Surgery, Philadelphia. Philadelphia: P. Blakiston, Son & Co., Pub., 1897. Price, cloth, \$5.00.

For years Richardson has been the leading students' text-book on mechanical dentistry. The seventh edition has been thoroughly revised and brought up to date. The editor says: "In preparing this edition the editor's effort has been to make it pre-eminently practical as a text-book for students, and a guide for young practitioners—an exponent of the present status of dental prosthesis. Much of the text has been re-written; three new chapters, new appliances and systems have been introduced, while useless methods and obsolete theories have been eliminated, thus keeping the dimensions of the book convenient and compact." Many new woodcuts from original sources have been added to the work, which makes in all about 700 engravings to illustrate the text. The book, in the main, is well arranged, and while there are some errors they are mostly of a minor character. The invention of the electric oven, for baking porcelain, however, is

credited to Dr. McBrier, when it should have been credited to Dr. Custer who was, without doubt, the first to give this invention to the profession. The work, as a whole, seems to meet the needs of students and its popularity will probably continue. The press-work, printing and binding are all that could be desired.

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## SOCIETIES.

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### **Eastern Ontario Dental Association.**

THE eighteenth annual meeting of the Eastern Ontario Dental Association, will be held at Cornwall, July 6th and 7th, 1897.

GEO. H. WEAGANT, *Secretary.*

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### **Wisconsin State Dental Society.**

THE twenty-seventh annual meeting of the Wisconsin State Dental Society will be held in the senate chamber, Madison, Wis., July 20, 21 and 22, 1897. The Wanona Lake assembly will be held during the same time, thus securing the reduced rates of a fare and one-third on all railroads. The State Board of Dental Examiners will meet at the same time and place for the purpose of examining candidates to practice dentistry.

W. H. CARSON, *Secretary.*  
128 Wisconsin St., Milwaukee, Wis.

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### **The National Association of Dental Examiners.**

THE fourteenth annual session will be held at Old Point Comfort, Va., commencing Friday morning, July 30th, at 10 A. M., and continuing in session Saturday, July 31, and Monday, August 2nd. The sessions will be held in the Hotel Chamberlain.

The hotels "Hygia" and "Chamberlain" will give rates of \$2.50 per day, two in a room; \$3.50 per day, one in a room.

Fares on all the trunk lines one full fare and one-third,

good for the sessions of the American and Southern Dental Associations.

The Old Dominion S. S. Co., Pier No. 26 North River, N. Y., will issue excursion tickets, including meals and berths, \$11.20, sailing every day, 3 p. m., from Thursday, July 29, using the name of the secretary.

Let every State send its delegates!

CHARLES A. MEEKER, D.D.S., *Secretary.*

27 Fulton Street, Newark, N. J.

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### New Jersey State Dental Society.

THE twenty-seventh annual meeting will be held in the Grand Atlantic Hotel, Atlantic City, commencing on Wednesday morning, July 21st, and continue in session two days. Seventeen papers of eminent men will be read upon interesting topics pertaining to the profession. Clinics of every description have been provided; four large rooms on the ground floor available for exhibits, with 110 volt current for electrical exhibits.

Hotel rates \$2.50 per day up. Accommodations for 700 guests.

Friends from the West and East, contemplating attending the A. D. A., will be able to attend this meeting and take the Old Dominion line of steamers from N. Y., Thursday, July 29th, 3 p. m., at an excursion rate of \$11.20, or the Penn. R. R. rate of one and one-third fare.

CHARLES A. MEEKER, D.D.S., *Secretary.*

Newark, N. J.

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### Northern Ohio Dental Society.

At the annual meeting, held at Put-in-Bay, June, 1897, the following officers were elected for the ensuing year:

President, L. P. Bethel, Kent; Vice-President, L. L. Barber, Toledo; Corresponding Secretary, W. T. Jackman, Cleveland; Recording Secretary, F. W. Knowlton, Akron; Treasurer, W. H. Fowler, Painesville.

*Executive Committee:* W. T. Jackman, G. H. Wilson, W. H. Todd.

*Membership Committee:* C. D. Peck, W. B. Conner, F. D. Davis.

*History Committee:* C. R. Butler, Corydon Palmer, Chas. Buffet, J. E. Robinson, J. W. Lyder.

*Neurology Committee:* J. F. Siddall, F. S. Whitslar, J. R. Callahan.

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### Dental Department, Western Reserve University.

THE annual commencement of Western Reserve University Dental College, was held May 17th, 1897, at Association Hall, Cleveland, Ohio. Rev. Livingston Taylor, D.D., delivered an address entitled "Home Thrusts." The degree of D.D.S. was conferred by President Charles F. Thwing, D.D., upon 31 graduates. There were 86 students, an increase of 62% over last year. The graduates were—Fred. S. Anderson, Lyman S. Armstrong, Clayton R. Baldwin, Morley J. Beal, William L. Beal, Carl F. Blair, William D. Bolton, Luther L. Bosworth, Clarence W. Davis, William R. Dixon, Dexter H. Fairbanks, Charles A. Fink, Ellason F. Grose, Arthur LaF. Higgins, William C. Honeywell, Harry M. King, A.B., Fred. L. Ludwick, William M. Megginson, Frederick La V. Miles, Frank A. Moran, Martin H. Morrison, John A. Osborne, Reuben W. Parker, Aubrey L. Parsons, M. Curtis Ramaley, William F. Spargar, William J. Stephan, Walter P. Smith, Burt E. Saunders, Charles F. Wallace, Frank L. West.

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### Ohio State Board of Dental Examiners—Annual Report.

AT the regular meeting of the Board, held May 26th, 1896, the following gentlemen passed the examination and were granted certificates: R. W. Cook, Rock Creek, O.; J. T. Gaskill, Plymouth, O.; D. M. Walker, Mantua, O.; H. F. Koontz, Antioch, O.; E. H. Alden, Middlefield, O.; W. S. Carnes, New Lisbon, O. There were twelve applicants for the examination, six of them passed.

Dr. J. W. Jackson and Dr. F. H. Lyder were elected for the

offices of president and secretary, respectively, for the ensuing year.

An opinion given to the Board by Attorney-General Monnett, relative to the issuing temporary permits to practice until the next regular meeting of the Board, was to the effect that the Board had no power to grant temporary permits of any nature, and could issue certificates only to persons passing the examinations given by the Board, in which examinations the general average of 80 % must be attained.

At the meeting of November 24th, eleven applicants took the examination, of which eight passed, as follows: G. H. Hunter, McArthur, O.; C. E. Womer, Republic, O.; Frank Gebert, Fostoria, O.; L. H. Simpkins, Orangeville, O.; F. M. Preston, New Philadelphia, O.; H. H. Jones, Parkman, O.; E. E. Albright, Cincinnati, O.; H. B. Stonebrook, Sherodsville, O.

It is the desire of the Board to give the candidates a practical examination in operative and prosthetic dentistry and metallurgy, but have not been able to carry out their desires, as the secretary has not the means of knowing those that will take the examination, which is necessary, as each person would have to bring his own instruments.

F. H. LYDER, *Sec'y.*

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#### Resolutions Adopted by the American Academy of Dental Science, Boston, Mass.

THE Academy, viewing with dismay the character of the advertisements appearing in some of the self-styled Dental Journals, whereby secret preparations, often of a highly dangerous character, are paraded in such company and guise as to deceive those not accustomed to scrutinize closely all medicines thus offered: and, more particularly, of advertisements soliciting dentists to advertise, announcing that "Professional dignity and good advertising will work well together," giving the name and address of the professional "Writer of Dentists' Advertisements," and the unscrupulous acceptance of the above mentioned journals of advertisements, the character of which is detrimental in the highest degree to the advancement of our profession, the best

element of which is striving with self-sacrificing and untiring labor to make it worthy the name and title of a liberal and learned profession, therefore,

RESOLVED:—That the Fellows of the American Academy of Dental Science condemn strongly such advertising, believing that it is degrading and injurious to the good name of the honorable calling they represent: and they further declare that the editors of such journals, allowing the common tricks of trade to dominate that which should be governed by professional dignity, are unworthy to be acknowledged as teachers and respected confreres among dentists.

RESOLVED:—That this resolution be forwarded to the editors of the leading dental journals, as expressing the sentiment of the Academy.

[The publishers of the OHIO DENTAL JOURNAL have always been careful in the selection of its advertising material, refusing all ads. that were in any way objectionable.—ED.]

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### Commencement.

THE Dental Department, University of Buffalo, held its commencement April 27th, 1897. Number of matriculates, 222; number of graduates, 70.

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### Haskell Post-Graduate School.

OUR readers will note the change of address of the Haskell Post-Graduate School from Columbus Memorial Building to 1209 Stewart Building. This is the oldest of the Post-Graduate schools and the courses of instruction under such a competent instructor as Dr. L. P. Haskell, have been elaborate, thorough and eminently satisfactory.

# THE OHIO DENTAL JOURNAL.

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## CONTRIBUTIONS.

### The Emerson System of Physical Culture for Dentists.\*

BY MISS ANNIE GRACE DAVIS, WARREN, PA.

THE literature relating to the care of the human body is already very extensive. Much has been written about the body's proper food, the air it should breath, the clothing by which it should be protected and the best method of its development. That literature needs little added to it until we come nearer to obeying the laws which it discloses and to feeling daily the help which comes from that obedience. It is the better use and guidance of this machine that I wish especially to impress upon you. When a perversion of nature's laws has continued from generation to generation, we of the tenth or eleventh generation cannot jump back into the place where the laws can work normally through us. We must climb back to an orderly life step by step and the compensation for the struggle is large in the growing realization of the laws we have been disobeying. The general impression seems to be that common sense should lead us to a better use of our bodies at once, whereas, common sense will not bring a true power of guiding the muscles any more than it will cause the muscles development, unless having common sense to

\*Paper read at Lake Erie Dental Society, May, 1897.

The editor and publishers are not responsible for the views of authors of papers published in the **OHIO DENTAL JOURNAL**, nor for any claims that may be made by them.

see the need. We realize also the necessity for cutting a path and walking in it. For muscle development many have been cut and a few are following them, though almost the only training now in use is followed by slight-of-hand performers, acrobats and professional athletes. As the muscles are guided by means of the nerves, a training for the guidance of the muscles means so far as the physique is concerned, a training for the better use of the nervous force.

We misuse our bodies in so many ways that it seems unnecessary to mention them, yet I want to call your attention to a few which are thrusting their evil results upon us every day in painful ways—still we have eyes and see not, ears and hear not, and for a lack of fuller realization of these mistakes, are plunging deeper into the snarl to which they bring us.

Extreme nervous tension seems to be so peculiarly American that a German physician coming to this country to practice became puzzled by the variety of nervous disorders he was called upon to help and finally announced his discovery of a new disease which he chose to call "Americanitis," and now we suffer from "Americanitis" in all its unlimited ways.

When illnesses are caused by disobedience to the perfect laws of nature, a steady, careful obedience to these laws will bring us to a healthful state again. But instead of adopting her simple laws and following quietly her perfect way we try by artificial means to gain a *rapid transit* back to her dominion and only succeed in getting farther away. What is the use of taking medicines to give us new strength while at the same time we are steadily disobeying the very laws, from the observance of which alone, the strength can come?

We misuse our nervous force even when we would rest. The longest and most perfect rest should be during sleep at night. Any nervous or muscular effort during sleep is not only useless but worse—it is pure waste of fuel. Few who pretend to rest give up entirely to the bed a *dead-weight* letting the bed hold them. Unless you are an exception you will be surprised to find how you are holding yourself on the bed. The spine seems to be the central point of tension—it does not give to the bed and rest there from end to end. The knees drawn up, the hands and arms contracted and the fingers clinched—either holding the pillow or themselves. The head holds itself onto the pillow, the

tongue cleaves to the roof of the mouth, the throat muscles are contracted and the muscles of the face are drawn up in one way or another. This seems like a list of horrors when we realize it is of "Tired nature's sweet restorer" we are speaking. Of course there are few cases where *all* these contractions are found but most everyone has several nervous and muscular strains. Do you hold yourself on your chair or does the chair hold you? How about your patients! do they clutch the arms of the chair, push with their feet and hold themselves off the chair as much as possible with every nerve alive with the expectation of being hurt? Most of the nervous fatigue suffered from dental work is in consequence of the unnecessary strain rather than actual pain. Being subject to the laws of gravitation why not give up to them? Sexes differ in kinds of courage. One becomes tired from a long railroad journey principally because of an unconscious officious effort to help carry the train or of resistance to the motion. The same strain is shown in driving when one tries to help the horses instead of yielding entirely and freely to the seat and motion of the carriage. Nature is our only guide in the matter of physical training. We all believe we look to nature, if we think at all, and it is a surprise to find how mistaken we are. The time would be well spent if we would take fifteen minutes every day to think of nature and her methods.

The freedom of an animal's body or a baby's to respond to every motion is beautiful to watch but before most children are three years old their inherited personal contractions begin and unless the little bodies can be watched and trained out of each unnecessary contraction as it appears there comes a time later when they must spend hours in learning to be babies again. But how shall we gain a natural repose? It is absurd to talk of the necessity without giving the remedy. There is a regular training which acts upon the nervous force and teaches its proper use, and this training we can have by practicing Dr. Emerson's system of Physical Culture, which aims at "the highest condition of health through such exercises as are authorized and required by the laws of the human economy." The first object in obedience to nature's law is the vital supply of the whole organism.

By this is meant the practice of those exercises which help the body to obtain nourishment from the food given it. This is accomplished, first, by securing the proper position of the vital

organs, and this is done by our first exercise.\* (Demonstrates.)



FIGURE 1.

DESCRIPTION.

*Exercise for Securing Perfect Poise.*—“Take position assumed in Fig. 1. The toes should point outward and describe an angle of about sixty degrees, the heels nearly touching each other. Now, with chest leading, poise the body as far forward as possible (without losing equilibrium), then as far backward as possible, maintaining throughout the entire exercise the same angle between chest and floor as in beginning. Now, swing the body

\*The descriptions of these exercises are quoted from Dr. Emerson's book, “Physical Culture,” and the engravings to illustrate the article were kindly loaned to us by Prof. Emerson.

back to first position, rise on toes, descend to position, touching heels lightly upon the floor, rise again and hold while counting four, then descend slowly to first position. Now take weight



FIGURE 5.

upon the ball of right foot, heel gently touching the floor. Swing left foot in a way to describe a circle around the right (Fig. 5), then back, not allowing it to touch the floor, and, finally, holding it behind the strong foot, poise the body forward, backward, to position, etc., as upon both feet. Transfer the weight to the other foot and repeat the exercise."

" You see all the organs in the body are lifted to their proper altitude and the whole person is in exact relation with the law of gravitation. Each part of the person is so lifted from every other part as to give it perfect freedom to act in its own sphere. The



FIGURE 6.

head does not oppress the neck, the neck the chest, the chest the viscera, the viscera the hips, the hips do not tax the knees for support, and the knees do not call upon the ankles for undue exertion."

There will be no more chronic dyspepsia or torpidity of the liver when people carry their vital organs properly.

The heart beats more perfectly when lifted high in the chest, the lungs consume more air, the stomach properly secretes gastric juice.

Another result of this exercise is good presence, dignity and ease. It is the presence which seems to tell what the person is in his essential being. What a person is affects us more than what he does.

He who is perfectly poised suggests great moral weight.

The perfect self-command required in poising with such nicety harmonizes the nerve action and all nerve force is thereby properly directed that unrestful nervous tension is commanded and repose is secured. All the muscles of the legs, trunk and neck are brought into activity.

Try this exercise for five minutes after you have been working over a specially trying patient and test its value.

*Exercises for Hips, Waist, Chest and Neck.*—“Correct standing position, with tips of fingers resting lightly upon the shoulders. Take the weight entirely upon one foot, and by a slow, steady movement send the hip corresponding with the strong foot, out at the side as far as possible, not allowing the chest to sway, but using it as a strong centre, as if the hips were to revolve about it. Keep the shoulders level. When a person is in this position he is much below the normal height. (See Fig. 6.) Next glide the weight from one foot to the other without rising. This is accomplished by bending the knee of the strong leg while straightening the other, and, at the same time, sending out the opposite hip. At the medium point in gliding from one foot to the other, the knees are equally bent. Repeat this exercise and return to position.

“The physical benefit derived from this exercise is in overcoming that friction in walking which expands the back and stomach; also in exercising the muscles across the stomach in a way to strengthen and promote its activity and thereby develop unity of action between those muscles which move the stomach and aid in the peristaltic wave, and those of the legs, so that whenever the individual walks, or stands upon one foot in ever so unconscious a manner, a direct quickening of the digestive forces will take place.

(To be continued.)

## The Implantation of Sterilized Roots of the Teeth of Beasts, for Carrying Artificial Crowns.\*

BY W. E. WALKER, D.D.S., PASS CHRISTIAN, MISS.

It is a deplorable fact that notwithstanding the great advancement made in the treatment of the various diseases of the oral cavity, occasionally a tooth is lost, in spite of all the best endeavors of the stomatologist to prevent such a calamity. It is therefore very desirable that we should be able to replace such lost organs, and often by other means than plate and bridge-work.

I need therefore to make no apology for introducing the subjects of implantation and transplantation. Since the introduction of the operation of implantation by Dr. Wm. J. Younger, in 1885, various substitutes for the roots of human teeth have been suggested, for carrying artificial crowns—as lead capsules, porcelain teeth, double staples of metal, etc. The literature on this subject does not indicate any marked degree of success with any of the manufactured roots.

As it is often a difficult matter to obtain a healthy root of a human tooth, suitable for this purpose, it has occurred to me that one might utilize the roots of the teeth of beasts, which are easily obtained from the slaughter-pen and which are, as a rule, free from disease, requiring, though, thorough sterilization. Before implanting they can be surmounted with Logan, or other crowns, a cast made of the mouth and bandage adjusted to cast by Dr. Jack's method, which I have found the most satisfactory.

While I have not found any beasts' teeth with roots very closely corresponding to those of human molars, this is immaterial, as the socket from which a molar has been removed requires remodelling, even to receive a human molar, for the roots of no two human molars are alike, and less cutting is necessary in using the large single root of a bovine central incisor; all that is demanded being the removal of the septum dividing the alveoli of the socket.

I have examined a number of heads and find that while

\* Abstract of paper read before the Dental Section, American Medical Association. Philadelphia June 17, 1887.

bovine central incisors are very well adapted to this purpose, it is not true of the laterals, at the age at which beef is usually slaughtered in this section of the country, the root of the lateral not being fully developed and the foramen very large.

This is not, strictly speaking, *implantation*, but a practical *transplantation*, which might be practiced by some who would hesitate to drill a socket in the molar region required for implantation, or who might be deterred by the difficulty of inserting a multi-rooted tooth.

I will not lengthen my paper by going into the details of removal of pulp, sterilization, canal-filling, adjusting artificial crowns, etc.

Any necessary variation in the procedure from what has been written on implantation and transplantation, will naturally suggest itself to anyone who will take the trouble of reviewing the literature on the subject before undertaking the operation.

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**Cataphoresis vs. The Direct Application of the Galvanic Current  
for Obtunding Sensitive Dentine ; and How to Do a  
Practice that Excludes Both.\***

BY W. G. A. BONWILL, PHILADELPHIA, PA.

WHAT have I to say about cutaphoresis? Is it a fact that a drug can be dissolved in water or any other media and be made to traverse the dentinal tubuli, enter the pulp chamber and produce an anesthetic or analgesic effect by osmosis? Or can it directly paralyze the sensitive dentine upon its surface and sufficiently deep to enable the operator to cut with impunity painlessly, as is claimed for most obtunders now found in the market? I should not attempt to quibble over osmosis or how or what does produce this supposed effect, but my long experience dating farther back than Dr. Richardson, of London, I think entitles me to ask what is the real agent in this wonderful discovery? There are so many means of influencing, not only the human being but all animals below man, so as to make them believe almost anything you wish even to the complete annulling of pain, that we must be wide-awake and very conversant with past history in this line, for

\*Abstract of Paper read before the Dental Section American Medical Association, Philadelphia, June, 1897.

us to say what agent has produced this so-called cataphorisis, or, as with other pain annullers, what is the true philosophy or *modus operandi* in analgesia?

Osmosis must be established or all such assertions as have been made fail to convince. Osmosis, according to the best authorities, can only take place between two fluids of dissimilar natures or densities, or gravities where a porous membrane of tissue intervenes, or where a porous porcelain cup is used. Then the fluids will in a short time, without any electricity, become of the same strength or gravity. But how can you take the fluid containing cocaine and pass it through a membrane that is not porous? Dentine is porous only when the tooth has been extracted and dried and is void of all organic matter. But so long as it is in the mouth it is full of fluid that is not interchangeable by osmosis, unless you can produce either in the pulp chamber or canal a different density to the fluids in the peridentalium.

If equilibrium exist between this medium of dentine on either side of it, then there is a *statu quo* condition and no osmosis. You might as well tell me that a cup can be made of dentine to take the place of the ordinary porous porcelain or burnt clay cup in a Bunsen battery, and make of it a battery. Now, I assert that in 1856, I know I did do all this obtunding by the simple galvanic current without dam or any other adjunct. Why will you persist in this absolutely useless and unnecessary procedure in loss of time, demoralizing your patients, fooling away your own senses trying to believe you are doing something that was never done before and is superlatively superior to all that was ever done in the past history of dentistry?

It is all well enough to try to alleviate pain in any operation, but when all of this can be done without, and the patient is enabled to see that dentistry is not the inhuman thing dentists would have them conceive, and have them feel and know that they can be taught to bear all the pain consequent upon any operations on the teeth, in excavating or removing pulp, why should you not adopt means long ago in your grasp for the asking and taking? From the many experiments of others in electrical therapeutics, as far back as 1860, osmosis was proven to take place by a current of electricity through a porous membrane or diaphragm, but never through bone either in a living subject or dead; and even when the osmosis was effected through a porous animal structure,

or membrane, it was only done after many hours' action. Teeth were extracted in this city, by electricity, as early as 1859, but it was only by the shock produced at the instant the forcep was applied, producing a diversion of the will force by causing a sudden and violent inhalation into the lungs, and while the lungs remained inflated, the effect was good, for the senses were, for the instant, submerged or subjugated. From my use of the battery and catching on to its workings upon myself and patients, I found that the continuous current, or, when interrupted several thousand times a minute, would annul pain when directly applied to the excavating, and the negative pole on the face or in the hand, and with no dam or other agent. All of this work, however, was preceded by experiments directly upon myself in the use of chloroform. These experiments led to the discovery that chloroform could be taken to that extent that I could excavate my own carious cavities without pain and yet be sensible of the sense of touch and ability to perform the operation upon myself. Chloroform while it would do what I wanted, would make my patients too sick, and I had to abandon its use. It was then that the battery for extractions alone was first brought out in Philadelphia, and I have told you the philosophy of shock in its action on respiration. I soon had it so exemplified to the satisfaction of the patient, that, while electricity would annul pain in sensitive dentine, and living pulps (if not inflamed), could be removed, yet from the too strong application of the current it gave the patient such a severe shock while excavating that a violent inspiration was the result which led me to exclaim: "Nature's Anesthetic," and I then saw that it was diversion of the will power, for when the lungs were being inflated so violently the will could not take cognizance of actual pain. It was for the instant complete. Let any of you hurt a finger and how soon it is put in the mouth and a violent inhalation taken several times until pain is relieved. The infant in crying violently while in pain, from an accident, is relieved and falls to sleep from the constant sobbing and increased inspiration. All temporary teeth I extract by this method in one sudden inhalation or diversion of the will and not a tear or complaint. Two or three teeth can be extracted while the breath is held in the lungs. You now know why I abandoned electricity for obtunding sensitive dentine and extracting, for this revelation of how nature relieves. I am led

to assert here to-day that all this cataphoresis in dentine, is only the work of the current pure and simple, and while I can annul pain in a few minutes by the current, I will not fool with it, as, by my present mode of practice, it is no longer worthy of my notice, and could you follow me day by day at the chair, you would adopt the means which would not rob you or your patient of that which neither can ever replace or have paid for remuneratively. I hold that it is all nonsense for you to practice deluding yourselves and robbing the public of valuable time, which, unless you get paid for every minute lost in the application of electricity by cataphoresis, you are a loser also.

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### A Series of Clinical Cases.\*

BY VIDA A. LATHAM, M.D., D.D.S., CHICAGO, ILL.

EVERY practitioner of dentistry, at some time or other, sees cases of this nature, perhaps meeting the disease in its earliest form. If he is able to recognize it and sound a note of warning, even though he may prefer to refer the case to a specialist, he has done a great favor to the patient, and has earned his gratitude.

#### MYELOID SARCOMA OF THE JAW.

Not long since I saw a case which had been sent to a dentist for advice regarding a right superior third molar that was troublesome. The patient was told to have the tooth removed, "as the wisdom teeth were of no value," and this was accordingly done. But there was no advice or suggestion of anything suspicious about the thickening of the gum around the outer side of the tooth. After a few months the patient became a medical student, and, as the socket showed some irritability, a junior teacher and dentist in the university school, was consulted. He pronounced the growth nothing but thickened gum and it was snipped off and thrown into the cuspidor, and the place touched with a counter-irritant. In a little while it was thought to be recurring, but the dentist said, "No; it was all right." And as he held a place in operative dentistry and was quiz-master on the subject, the

\* Abstract of paper read before the Dental Section, American Medical Association, June, 1897.

matter was left on his advice. Only a few months later the student transferred to another school and happened to hear a lecture on the subject, the importance of which started a feeling of uneasiness. At this time I made the acquaintance of the student, who consulted me for examination and advice. Truly the growth was small and seemingly innocent and fibroid in character, and I asked leave to watch the case for a short time. Finding that it grew larger, I advised thorough and immediate operation, as I feared a sarcomatous epulus. On account of the position of the former dentist and not wishing to seem to urge operation on a small matter, I suggested the consultation of an older and more experienced specialist than myself. After a little persuasion the patient consented to the removal of a small piece of tissue for examination. The opposite end of the tissues from the neighborhood of the periosteal surface, showed the early but rapidly growing and malignant nature of the tissue. A typical myeloid or giant-celled sarcoma. The patient, who knew something of the danger of such a growth, was eager for a thorough radical operation, which was performed by the consulting oral surgeon. After eighteen months there has been no recurrence.

The great danger in this case lay in the fact that the growth first appeared behind and on the buccal surface of the gum, near the third molar, and its course of progression would have been up the palate process along the maxillary tuberosity and posterior palatine canal, so invading the antrum and palato-glossal folds. It is generally believed that myeloid sarcomata are common in the maxillæ, though Bland Sutton says they are rare, and as a rule, arise in connection with the nasal process. In the maxilæ or mandible they arise from the body of the bone.

#### SMALL SPINDLE-CELLED SARCOMA OF THE PALATE.

In this case the patient, aged 33 years, had been in perfect health up to six months previous to the time he came under my observation. There appeared a thickening on the left lingual surface of the palate. At first the patient was but little concerned, thinking it only a local irritation, but as it slowly increased in size, he consulted a dentist, who told him it was a chronic inflammatory growth, and possibly due to his smoking a pipe. This habit was discontinued and the swelling treated by counter-irritation, which gave no relief. By this time the place

was a source of annoyance, as the patient could not keep his tongue from it, and he determined to have it removed by his family physician. The latter, upon examination of the growth, found that it extended from the first molar to the soft palate, within half an inch of the uvula, and becoming suspicious of its nature, he decided to prepare for a radical operation and gained the patient's consent to do what he deemed best. The growth was periosteal in origin and was thoroughly extirpated, the teeth being extracted on that side and the alveolar border curetted, removing all tissue that looked dangerous or even suspicious. There has been no recurrence.

The differential diagnosis between palatal abscess and sarcoma, shows the following points: Sarcoma, springing from the periosteum of the hard palate, appears as a soft, semi-elastic, more or less rapidly growing tumor, affecting the roof of the mouth. A palatal abscess, originating from any of the upper teeth or burrowing backwards beneath the bone and periosteum, or in the soft tissues forming the roof of the mouth, gives rise to pain, and inflammation attends its development; it extends more rapidly, and gives an elastic feeling of fluctuation. There is the evidence of a carious tooth, and in chronic cases the diagnosis can be made positively by using exploratory puncture.

#### SARCOMA OF THE ANTRUM.

The patient, a well-built boy of 15 years, complained of constant pain in the left upper first molar, which was treated. In about three weeks his cheek began to swell, and on returning to the dentist the boy was informed that the swelling was an abscess. Free incisions were made and no pus found. As he got no better and the pain continued, the patient left his dentist, going to one of the well-known advertising houses, and there was told to have the tooth extracted. This was done, and after the somewhat profuse hemorrhage, which followed, the pain was better. The swelling, however, did not disappear, and I saw the case upon recommendation of the family physician. The unilateral bulging of the antrum, and upper displacement of the eye, the slight amount of pain, together with the history and previous treatment, led to the diagnosis of sarcoma of rapid growth. I gave the patient an unfavorable prognosis and urged a speedy removal of the upper jaw, which was done. Then the soft parts

were laid back and the disease found to be very extensive, requiring the removal of the entire superior maxilla and malar bones, the zygoma, and part of the temporal and masseter muscles, hemorrhage was very severe, but was controlled by iodoform packing and comp. tincture benzoin. In spite of this bold and severe operation, the disease recurred, and the patient died from exhaustion. The microscope showed the tumor to be a small round-celled sarcoma.

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### Resection and Reproduction of the Maxillæ.\*

BY G. LENOX CURTIS, M.D., NEW YORK.

Formerly Professor of Oral and Facial Surgery, New York Dental School, and Instructor in the New York Post Graduate Medical School and Hospital.

THE purpose of this paper is to show the profession the importance of special study and instruction in oral and facial diseases, and that these are worthy of the same consideration as is given to any of the fully recognized specialties in medicine. Until they do appear in the curriculum of the medical school, the faculty will not have done its duty toward the student. The field covered by the general surgeon is altogether too great for a careful consideration of any part where such minuteness is required to save and assist nature in doing her work. The surgeon most capable of successful teaching in this line, is he who has been a thorough and conservative dentist.

Like produces like; this applies to every department in nature. The periosteum, under favorable conditions, will reproduce the substance it covered. That of the ramus of the jaw will only make the thin lamina of bone which nature has originally placed there, while that of the malar and the body of the jaw reproduces a dense structure differing materially in texture.

If the function of a part be permanently lost, reproduction is not a necessity, nature supplying that part only which is required. If the teeth have been extracted with a view of remaining out, the portion of the jaw which is required to nourish them is not reproduced, but where the teeth are replaced and retained, all,

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\*Abstract of paper read before the Dental Section, American Medical Association, Philadelphia, June, 1897.

or sufficient of the bone is reproduced and reattaches them to the jaw. Such I have seen in active use for years.

The only condition I can ascribe for the removal of the periosteum, is where it is attacked by disease, such as cancer, and the entire structure is destroyed. When the bone alone is destroyed, as in necrosis, cystic tumors, or from pressure by resistance of a growth, as tumor of the antrum, I see not the slightest necessity for removing this natural sheath, but on the contrary every reason for retaining it. I have seen Billroth, Van Burgmann, Agnew, Ashurst, Garretson, and other great surgeons resect the jaw, but they invariably employed Huyfelder's, Ferguson's or Langenbeck's method, except in cases of necrosis, where but small sections were involved. Liston, Tait, Barton, Mütter and Gross also followed on these lines.

But what can we say for the subject? Partially or wholly jawless, maimed and disfigured for life, a repulsive and pitiable object to others and a shrinking annoyance to himself. Is it not time to call a halt and look this matter squarely in the face?

I do not censure the surgeon whose opportunities to acquire knowledge have been dwarfed by the oversight of his teachers.

#### METHOD OF PRESERVING CONTOUR OF THE JAW.

My method to obtain the best results in the preservation of the contour of the jaw, is by retaining the necrosed bone in position until the periosteum has been so strengthened by the reproduction as to allow nature's outlines to be maintained, employing it as an inter-osseous splint. Where it is necessary to remove the bone, I retain the contour of the face by gauze packing and change from time to time until the bone is sufficiently reproduced to resume its shape. This requires frequent dressing so that the amount of pus may be kept at the minimum. The teeth are retained in position by means of inter-dental splints or ligatures. Where the teeth are lost, I place other teeth in the opening when the wound is nearly closed, maintaining them by artificial support and allowing the bone to form around them. Where the destruction of the bone has been great and the periosteum too weak to retain the jaw in position during the process of reproduction, I use an inter dental splint, (as employed by Liston over fifty years ago) in which the upper and lower teeth properly occlude. By hastening slowly, the danger of wounding the dental nerve is materially lessened.

Scarce can we read a text-book in which is not found methods on treatment of facial diseases in vogue half a century ago.

#### CASE IN PRACTICE.

In 1886 I operated on a young woman, age 23, with the following history: Four years previous after suffering much pain in the face, which was swollen, a fistula appeared in the lower jaw which was diagnosed as being from an abscessed tooth. The gums around the tooth were swollen and inflamed, the molars and second bicuspids were extracted and the pus continued to flow. Her health rapidly diminished, menses ceased, and had not returned, although constantly under medical and surgical treatment.

Examination revealed the emaciated condition of the patient. She was suffering from blood poisoning, was highly nervous and hysterical, had no desire for food and had lost the sympathy of her doctors and family. In the left inferior maxilla where the tooth had been extracted, there were granulations. A boggy condition of the mucous membrane extended all along that side of the jaw. Over the ramus it was particularly inflamed. The probe readily passed beneath the periosteum and far up along the ramus. The patient was then too sick for an operation with a view to best results. The wound was cleansed daily to lessen the amount of pus, and for one month the patient was placed under most rigid restorative treatment with good results. I found that under the local stimulating treatment, bone had been sufficiently reproduced to strengthen the periosteum so that when I removed the dead jaw the contour was preserved. The cause of the trouble I found to be a wisdom tooth lying transversely at the neck of the jaw immediately under the condyle. This along with the granulations and debris was removed. The wound was packed continually until healthy granulations filled in the periosteum; the jaw, minus the teeth was reproduced with all its usefulness. Complete restoration to health and a gain of twenty pounds in weight followed this work. The nerves and vessels in the jaw were not injured and no paralysis resulted.

#### OSSEOUS TUMOR OF THE ANTRUM—OPERATION.

Before my class at the New York Post Graduate Medical School and Hospital on March 25, 1893, I operated on a lad fifteen years of age, who gave the following history:

Three years before, while at play, he ran against a lamp-post, striking the left side of his face and bruising it severely. A year later there appeared on the face, over the malar bone, a hard lump, which continued to increase until it was the size of a hen's egg, preventing the boy from seeing, with that eye, objects on the ground near by, without bending his head. He had not realized any special pain or discomfort from the tumor. Thinking the trouble arose from the abscessed teeth, his dentist extracted the upper, left, first bicuspid, which showed no evidence of being diseased. I diagnosed an osseous tumor of the antrum, and found that the malar and superior maxillary bones were completely destroyed by the direct pressure against them, only the periosteum remaining. Not only was the tumor directed outward, but downward, depressing the roof of the mouth, and extending beyond the alveolar process, against the buccinator muscle. An incision was made through the periosteum, encircling the teeth, as seen in the specimen here presented, in which the tumor and teeth are attached, and it will be noticed that only a small part of the alveolar process remained intact. This, with the teeth, was removed, the entire side of the face falling into the cavity made by their absence, so completely was the malar and the superior maxillary bones destroyed. The inferior orbital ridge and zygoma only resisting the pressure of the tumor. A profuse hemorrhage followed its removal, but was readily checked by hot water. The wound was packed with aristol and gauze, and the contour of the face secured. The periosteum united with sutures. Through this opening the wound was dressed until the shape of the face was permanently restored. Time of operation twenty-five minutes.

The following day there was considerable oedema, which readily subsided. From day to day the dressing was changed until the periosteum could support itself, and in two weeks the case was dismissed from the hospital. The antrum was douched daily until restoration was complete. An artificial denture was made to replace those lost, to give the normal fullness to the mouth. In this operation there was no external wound, consequently no necessity for ligature and no scarring of the face which would necessarily follow had the operation been done on the lines drawn in general surgery. The wound completely healed in six weeks with no deformity of the face. I have seen

the case from time to time and in every way it is eminently satisfactory.

REMARKS.

To facilitate cleansing of the wound and destruction of the pus, let me recommend to you electrozone, the best of all agents I have found for this purpose. Under its use the pus melts away like dew before the morning sun.

I have done many cases similar to these stated and without deformity in any instance. All of them are accompanied by blood poisoning and have usually been treated for rheumatism, malaria and typhoid fever for months and even years, before the error is discovered.

This conservative method is not conducive to a fine selection of pathological specimens, as a recovery of a part without blemish leaves only the history of the case and the statement of the patient as proof of the malady.

The student should have a chance to see in practice the methods he wishes to adopt. In this city, only recently, at our great University no end of strife resulted from a determined and successful effort of the dental department to make a place in the hospital for their oral surgeon, with equal right to operate. This was the beginning of the end when all such institutions must of necessity adopt the same course. Why confine this work to so called major operations, when they can be simplified to the minor class by annexing such men skilled in dentistry and medicine alike, to the medical faculty?

Let us hope that the controllers of such faculties will appreciate that "knowledge is power" and that new methods are a necessity.

7 W. 58th St.

## Tumors of the Maxilla.\*

BY WM. KNIGHT, M.D., D.D.S., CINCINNATI, O.

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Cincinnati.

In this paper it is intended to briefly describe some of the more ordinary neoplasms of the maxilla.

The upper, as well as the lower maxillary bones, besides being subject to diseases affecting other bony structures of the body, are liable to the invasion of neoplasms peculiar and limited to themselves; among these may be mentioned, the epulides, dentigerous and multilocular cystic tumors. The pathological congeners of the epulides, may, however, be found in other parts of the body, but it is not customary to call every growth found arising from the gums, or from the periosteum of the alveoli, an epulus.

Two distinct forms of epulus, and only two forms, are to be recognized as affecting these bones. The recognition of these forms of epulus is of importance, not only from a pathological, but mainly from a surgical standpoint, as deciding the proper treatment, which is different in the two affections.

The hard or fibrous form is by far the more innocent in its pathological effects. It is almost identical with the fibrous growths found in other parts of the body, yet it differs from them mainly in its tendency to form spicula of bone in its construction.

The myeloid or softer form is composed of but a small amount of fibrous tissue, the rest of the neoplasm being largely composed of polynucleated myeloid cells; the first variety is closely connected with the gum, also with the periosteum of the alveolus, it springs from the inner or outer surface, and unless of long standing and of large growth, seldom if ever, invades the entire thickness of the alveolar process. The second form or myeloid variety is more closely allied to the endosteal than the periosteal structures and is connected within the alveolus; it has a marked tendency to invade the entire thickness of the alveolar process; it does not attack the deeper portion of the bone unless improperly treated with irritants, when it may assume a malignant condition and quickly infiltrate the surrounding tissues.

\*Abstract of Paper read before the Dental Section Amer. Med. Association, Philadelphia, June, 1895.

The etiology of either form of epulus is somewhat obscure, both varieties have been observed before the eruption of the teeth in infants. It is, however, generally agreed that some prolonged dental irritation is the usual exciting cause of this affection, as instanced in the following:

#### CASE IN PRACTICE.

A lady, aged forty-five, was referred two years ago to me for treatment; she had worn for five years a lower dental plate that had caused her some annoyance, yet was unattended by any special pain.

On June 10th, 1895, when I examined her mouth, there was seen a small growth the size of a hazel-nut, occupying the bicuspid region of the left lower jaw; she stated that the growth had been present for more than a year, but to her great alarm had enlarged considerably during the past few months. Having consented to an operation, the alveolar process from the lower lateral incisor to the first molar, down to and including a portion of the basilar part of the bone, was removed, when a fragment of the root of the second bicuspid was found imbedded in the bone. This fragment of a tooth had been in all probability, the original cause of the formation of the tumor, which upon section, proved to be a myeloid growth; although the jaw was accidentally fractured toward the completion of the operation, no untoward symptom followed. At the present date, May 31st, 1897, the patient is wearing a new lower plate. There is no evidence of any return of the disease.

#### MYELOID EPULUS.

In all instances in which the surgeon suspects a myeloid epulus he should not rest content without removing the entire thickness of the alveolar process; there is, perhaps, no more pitiful story in surgery, than for a surgeon, when a case of the kind returns to him with a sarcoma occupying the seat of the former operation with perhaps infiltration of the floor of the mouth, to declare that permanent relief is almost hopeless, and to think, if during the operation more of the jaw had been removed, this might not have happened. The essayist speaks from experience, and he hopes never again to make the same mistake.

## TREATMENT OF MYELOID EPULUS.

In the treatment of myeloid epulus, in consequence of the extensive involvement of the alveolar portion of the bone, when the growth apparently springs from one plate only, radical measures must be insisted upon. It is always the wiser plan to remove the entire thickness of the process, sacrificing whichever tooth it may be deemed necessary, to effect a thorough removal of the disease. It is in these cases that imperfect operations are more than useless, for when imperfectly removed, it is the unfortunate tendency of myeloid epulus, to return in a still more malignant form. This fact is so well recognized, that no operator in treating these cases should be satisfied unless he removes outlying tissue beyond the apparent extent of the growth. The best method to be employed for the purpose, is to saw completely through the alveolar process on each side of the disease, and then with one of the various forms of cross-cutting bone forceps to remove the entire piece of bone with the tumor. It is my invariable practice after having removed the affected piece of bone, to use the bone gouge freely, so far as possible, to remove every vestige of the disease. The free hemorrhage which arises in these cases is easily controlled by pressing a few small pledges of cotton into the wound ; the hemorrhage having ceased, compresses of cotton, saturated with a weak boracic acid, or a per mangate of potash solution can be gently pressed into the wound ; these compresses are readily retained in position without much inconvenience to the patient, by his simply keeping his mouth closed ; external bandaging is seldom required. Twenty-four hours having elapsed since the operation, the compresses may be removed, and the mouth should be rinsed four times a day with a solution of five grains of permanganate of potash to one ounce of water. In ordinary cases no other treatment is required.

In the fibrous or hard form of epulus, it is seldom necessary to remove the entire thickness of the alveolar process, although it is advisable always to remove either the inner or outer plate upon which the growth is attached : it is prudent in order to effect a limited destruction of the bone, to touch the site of the removed growth with the actual cautery ; those who object to the use of the cautery can produce the same result, by touching the part with nitric acid, chloride of zinc, or the triclor-acetic acid.

It is seldom necessary to sacrifice the teeth contiguous to the tumor, as the unremoved plate is sufficient to retain them in place, and in many instances, years after the operation, the teeth are found to be firm and in good condition.

#### CYSTIC TUMORS.

Cystic diseases of the maxillary bones are perhaps more frequently due either to disease of fully developed teeth or they are associated with teeth that have been imperfectly developed. The formation of cyst from either one of these two causes may attain to a very large size, giving rise to absorption to a greater or less extent of the walls of the maxilla, without in so doing, giving rise to much inconvenience to the patient.

It is claimed by Broca, whose views on this subject meet with general recognition, that the great majority of cysts of the jaws have their origin in tooth follicles. It is held that the soft gelatinous enamel organ being easily affected by morbid influences readily disappears leaving in the follicle a cavity which is ready to be transformed into a cyst. Some of these cases seem to arise without any appreciable cause. An instance of this kind was four years ago referred to me by Dr. F. Sage, of Cincinnati.

#### CASE IN PRACTICE.

The lady, forty-six years of age, had, occupying the right side of the lower jaw, a small cystic tumor in the bicuspid region; the tumor had been of slow, but continuous growth; at no time during the development had pain been experienced. She sought medical council partly on account of the inconvenience of its increasing size, but mainly from the fear, that so often possess the laity, that whenever a growth appears on any part of the body, it must of necessity be a cancer. Careful inquiry into her history failed to elicit any fact that would give a clue to the cause of the trouble, upon which an opinion might be founded. Both dentitions had been normal and the teeth in the immediate neighborhood of the growth were in good condition. A careful search was made during the operation to discover any probable cause that might have produced a tumor, but none was found. Four years have passed since the operation, and there has been no return of the affection. Although the etiology of cystic tumors occurring in the jaw bones, has in recent years been elucidated to a very large extent, much still remains in doubt.

## CAUSE OF CYSTIC TUMORS.

Mr. Christopher Heath in his work on the "Diseases of the Jaw," has made particular mention of the views held by Mr. F. Eve\* as to the development of multilocular cystic tumors of the maxilla. Mr. Eve maintains, that so far from multilocular cystic tumors having a dental origin, they are on the contrary produced by an ingrowth of the epithelium of the gum.

This class of tumors frequently follow injury, or irritation of decayed teeth, or long-continued inflammation, which has lead to an increased supply of blood to the parts. They are slow of growth, they do not affect the lymphatic glands, nor infiltrate the surrounding parts.

These tumors are innocent in character, but owing at times to their enormous increase and multiplicity, they not infrequently necessitate the removal of the larger portion of the lower jaw, which bone is specially obnoxious to the disease.

## TREATMENT OF CYSTIC TUMORS.

The treatment of cystic tumors necessarily varies according to the form of the cyst; if it be a single cyst connected with a fang of a tooth, the extracting of the offending body will usually be sufficient to effect a cure, if however, it be of larger size and has caused some expansion of the bone, an incision through its bony wall will be necessary. This operation will evacuate the fluid, which is usually of a dark clear color, unless inflammation has been present, in which event, the contents will be of a more purulent character. It is also the best practice to cut away a good portion of the cyst wall, as otherwise the cyst is likely to rapidly reform. In all instances in which a tooth is suspected of being present within a cyst, a careful search for it should be made, for it is obvious, that resolution will be impossible so long as the tooth is retained. In both of the above instances, the after-treatment consists in simply using four times a day an antiseptic and slightly astringent mouth wash. In these cases where a portion of the wall of the cyst has been removed, the cavity should be plugged with boracic acid gauze or lint that has been saturated with a solution of permanganate of potash. This packing might be removed and a fresh one used if necessary in forty-eight hours time.

\*Mr. Eve's paper, as originally published, is to be found in the British Medical Journal for January 6th, 1893.

But in the treatment of multilocular cystic tumors more radical measures must be adopted. If any suspicion exists as to the possibility of a sarcomatous complication, which is not infrequently the case in this character of growth, the removal of the portion of the affected bone is always recommended, and has been the usual procedure ; if, however, the diagnosis can be satisfactorily determined as to the absence of a malignant factor, the operation as recommended by Mr. Butcher, of Dublin, can be performed. This operation consists in dividing the mucous membrane covering the cyst, and then with gouge and bone forceps or chisel and mallet, thoroughly removing all of the affected parts. The success of this operation depends entirely upon the completeness with which this is done.

#### SARCOMATOUS GROWTHS.

A malignant tumor, composed of the same structural elements, differs in its clinical history according as it attacks the soft or the bony tissues, and differs also in bone, as to whether the compact or cancellous tissue is involved. Thus, a round-celled sarcoma will not infrequently develop within the interior of the lower jaw, and will give rise to no other symptom than perhaps enlargement of the bone. This condition may continue to exist for several years before the tumor has attained the size of a walnut, the patient during all this period complaining only of the small deformity, caused by the slowly growing enlargement. What a contrast this offers to the rapidly growing sarcoma, as it occurs in the softer tissues. This difference of growth in the same structurally formed neoplasm, may partly be explained by its elementary formation. All varieties of the sarcoma belong to the type of the embryonic connective tissue. The cells of which they are composed have no definite arrangement, they are in constant relation with the stroma, and consequently the cell not being surrounded by alveoli, as in the case with the carcinomata, have a marked tendency to infiltrate the neighboring tissues at a very early period. The blood-vessels of a sarcoma ramify among the cells, and are very thin walled, hence the frequent occurrence of hemorrhage into their substance, and their rapid dissemination through the vascular, and not that of the lymphatic system of vessels.

The compact tissue of bone antagonizes to a marked degree the favorable conditions for sarcomatous growth; this is especially the case when a sarcoma develops between two plates of bone, as when a neoplasm of this character forms in the interior of the lower jaw, occupying an intermediary position, clinically speaking, between the rapidly growing sarcoma of the soft parts, and those slow growing ones occurring in the lower jaw, are those instances of sarcoma originating in the connective tissue of the mucous membrane lining the antrum of Highmore; this is by no means an uncommon location for the development of primary sarcoma. The history of all such cases is very similar. The sufferer complains of pain, which is often referred to a tooth contained in the affected jaw; the offending member is sometimes treated, more frequently, however, it is extracted; the relief, if any, afforded by these means, is but temporary. The uneasiness and pain continue, with perhaps some intermission. This condition may, and usually does, continue for a considerable time before any swelling of the part is observed; after the swelling appears the disease is apt to increase rapidly, and the growth, which, by this time, has completely filled the antrum, and has infiltrated the bony walls of the cavity, has a tendency to fungate and to bleed readily. A case of this kind was referred to me by Dr. F. Saul.

#### CASE IN PRACTICE.

The sufferer was a man 42 years of age. For two years past he had intermittent pain in the upper second bicuspid; although the tooth was in a sound condition, he had it extracted, yet without obtaining any relief. Two months subsequently, when he came to me, a slight swelling appeared on the right cheek, and a suspicious-looking growth in the alveolus of the extracted tooth. He stated that he had some pain almost all the time, which now and then was severe. He was advised to have the right maxillary removed; to this, however, he dissented. Five months subsequently he returned. The swelling now extended upwards under the zygoma, and reached the temporal region. To operate with hope of permanent relief under such conditions, being extremely doubtful, he was so informed, as he was now very eager to have the operation performed. The upper right half of the maxillary bone was removed, together with considerable of the surrounding tissue. The tumor proved to be a round-celled sar-

coma. Seven months after the disease returned and a second operation was performed. This, for a few months, gave him relief, after which the hemorrhage ensued, which occurring periodically terminated in death.

To a certain extent this case illustrates the clinical history of sarcoma, when originating in the antrum. Intermittancy of growth at first, which is somewhat characteristic of sarcoma, wherever it occurs. This was followed by slow but continuous enlargement, and finally after the bony walls of the antrum had yielded, by a rapid increase in growth, with infiltration of all the surrounding parts.

#### TREATMENT OF SARCOMA.

The treatment of sarcoma must be radical. Any contemplated operation should be done as early as a diagnosis can be made. As long as a sarcoma is confined within the bony walls of the antrum, a hopeful result as to a permanent cure can be looked for, but after this disease has passed beyond these confines, any operation, however heroic it may be, will result usually in failure, as it is almost impossible to remove all of the affected tissues. As for myself I always refuse to operate in advanced cases of sarcoma of the upper jaw, without informing the patient, or his friends, of a probability of the return of the disease, and agreeing to operate simply as a means of relieving temporarily the suffering of the person so affected.

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#### Preliminary Education and Training a Desideratum in Dentistry.

BY DR. A. M. ALLEN, GROVE CITY, PA.

*(Continued from page 332.)*

WHILE the exhibition of service conveys with it the necessary and indispensable idea of national compensation, without which to stimulate and encourage much of the very best service and effort would not appear, therefore, Paul-like, we should have "respect to the recompense of the reward," even in things material, yet due care should be observed lest by prominence it should become the ruling and controlling purpose of lives. Better

far that we should let our employment serve as a means to the end of doing good unto others. Should we not therefore, as members of the profession we love, whose highest good we seek, as well as in the interest of those whom we serve, strive by all honorable means to encourage such regulation and legislation as will secure to us the requirements of a higher literary and preliminary training of uniform standard, as a condition of admittance to our dental colleges? Young men of limited means and education, perhaps casting about for some field of employment which will yield the quickest return for the least expenditure, while by lack of these qualifications find themselves debarred from entering other professions, in dentistry find the *summum bonum* of their desire, they reason and not illogically, either that since no preliminary training or advanced literary education is required, they are not necessary and consequently time and means spent in their acquirement are only wasted.

We have known of but one young man, who while pursuing a literary course of study, decided upon the practice of dentistry as his to obtain, who persevered therein until he received his college diploma, and he was at that time a member of the senior class; whilst on the other hand, of those who have forthwith relaxed all effort in that direction or refused to undertake them, we have personal knowledge of almost a score.

Gentlemen, is not the present attitude of our profession on this question to be deplored, placing as it does a premium upon illiteracy, the results of which, if persevered in, only the future can reveal.

Private preceptorship, extending so far as possible over the entire college course, would result in material benefit to those immediately concerned and save from much of the present temptation to irregular and smuggling methods, and illegal practices of undergraduates, which injure all and weaken the public confidence.

Such opportunities for general and thorough familiarization of the means and usages and daily requirements of the profession, can be obtained nowhere else better than in the private office of cultured licensed practitioners.

He who has not at the beginning availed himself of the advantages of a private tutelage, by acquainting himself with the necessary furnishings and equipments of an office; with the

namerous instruments and appliances ; how to care for and properly use them ; the numerous and varied operations we are called upon to perform ; the nomenclature, technicalities, text-books and literature of the profession, and last but not least some knowledge of proper office decorum and behavior, together with a knowledge of human nature, which can here be studied to such excellent advantage ; the thousand and one little cares and duties in point of order and cleanliness, artistic taste, etc., in office appointments, the successes and failures, encouragements, disappointments and discouragements, which go to make up the daily experience of the busy dentist, which to many is no doubt a revelation, as they seem to think the dentist's life but one smooth sea of shining gold ; he who has not availed himself of such preliminary training. I repeat, enters college at a disadvantage to himself and his instructors, and begins practice amid numerous and unforeseen difficulties and discouragements.

If we cannot control this mighty stream of occupation which is coming in upon us like a flood, may we not with reasonable hope of success seek to change the character by applying at its source such methods of purification as may seem best adapted to her needs and militate to the general welfare of society, so that instead of being avoided by those whom we should aid, because of methods not above public criticism ; motives not above suspicion, and practices unworthy of public encouragement. The benign influence and noble purpose of the profession may be recognized ; the highest public confidence may be enjoyed and its blessed benefits eagerly sought after and appreciated by suffering humanity.

Arrangements have lately been perfected whereby literary and medical institutions may become co-operative. These literary institutions adopting an optional full year course, preparatory in medicine, as supplementary to their curriculum of study, which in turn is justly recognized by medical institutions, said graduates recieving one year's preferment by them.

Here it seems to us is a valuable suggestion for us. The preliminary course in medicine and dentistry being almost identical, with such slight alterations as might be necessary, why could not a similar arrangement be effected with these institutions whereby prospective students of dentistry could enjoy equal privileges and in turn recieve at the hands of our colleges the same recog-

nition. And just now at this time when a four years course of study is being agitated, with high probability of success, is not the time opportune for the advocacy of such an arrangement of co-operative education instead?

Certainly by its operation neither class would have anything to lose, save in dentistry the maintaining of the present length of course and in consequent curtailing of the revenues thereof, a loss we feel these institutions could well afford to sustain in consideration of the inestimable benefits which the profession in general would most certainly derive therefrom.

To increase our present course of study without enlarging the curriculum or elevating the admission standard (a thing which has already been done), we must subject our colleges to the most just criticism of being classified with those institutions whose declaration of principles is "a tariff for revenue only!"

Without an increase in the curriculum of study, we feel that a three year course, as at present, is amply long for a familiarization of its subjects.

Our argument, gentlemen, is not in favor of shortening our present course, but against lengthening it in the manner proposed, *i. e.*, as in the past, which has brought about a system of educating by repeated repetitions, with the greater number of subjects, which in the main is simply a rehashing of the subject matter year after year.

Gentlemen, it is our honest opinion that our present need is a three year course of solid progressive work upon our present curriculum, supplemented with a thorough literary education, as a foundation, and private preliminary and interim training or preceptorship as an adjunct, and that such would accomplish more real practical good and produce grander results than a five years course of study without them.

#### DISCUSSION.

DR. GRANT MITCHELL: The paper just read appeals to me very forcibly. The subject is vast, but it has been handled in such a masterly way, that I feel an attempt to discuss it from my point of view, would be but to reiterate what has already been so excellently told. . . . The subject is of such interest, however, that I cannot refrain from giving some little emphasis to certain vital portions of the essay.

As a matter of course, the importance of a thorough, general, literary education, to the intelligent practice of a learned profession—of the proper preliminary manual training and preparation of already well-disciplined minds, for the special drilling necessary for scientific pursuits—is so well understood as to seem almost rudimental. . . . But it may not have occurred to all of you that the simple mechanical functions of dentistry are easy of acquirement, and in consequence, the rapid multiplication of dental colleges is assuming the proportions of an *evil* which threatens the profession of dentistry—vastly overshadowing in its menacing aspect, those puny institutions which style themselves “parlors,” with a “New York” or “Philadelphia” prefix, and which seem to greatly worry many members of our profession.

In making this claim, we do not stand in any selfish (and imaginary) fear for our personal future as practitioners of dentistry, induced by apprehensions of floods from the gates annually thrown open by these increasing institutions.

I do not believe that the multiplication of dental colleges and other means of conferring a legal right to engage in the art upon the army of unambitious youths who seem to see in dentistry only a field in which to gain a livelihood, without the expenditure of brain or brawn, and who seek the easiest methods of obtaining the *legal* right to prey upon the credulity of the public within this sphere, can materially effect any of us here present. . . . But I am jealous of my profession's honor and position among the learned professions. . . . I want the people whose acquaintance and friendship I crave, to feel that the vocation I have chosen to follow is a dignified calling—that it is a learned and scientific profession, and at *least*, that it is worthy of me. Therefore, I repeat, ability to gain a livelihood being dependent, wholly upon individual efforts, narrow fears for our future in this field, are not excited by the mere *numbers* annually being added to our ranks. . . . But I protest that dental colleges, in the United States, are becoming too numerous an “industry” to long maintain that proud dignity with which we have been wont to mantle our beloved profession.

The necessity for funds to maintain these numerous institutions, makes competition between them of a character not always laudable. . . . Few of them but boast of phenomenal attendance, with reference to numbers. . . . Few can boast of the

average intellectual character of their classes . . . and none can boast of the severity of the tests applied to ascertain what benefits have been derived from the course of instruction.

Not one in making its plea for patronage, offers as a chief inducement that at the close of its courses, it shall subject each candidate for graduation to an examination so strict, so thorough, that to him who is successful, its diploma shall stand as a guarantee to the public of entire and reliable fitness to practice a profession involving the comfort and health of a people, ignorant of qualifications or requirements, and who are guided in the selection of a dentist or a physician, not by a knowledge of his proficiency, by his *personality*—his outward appearance. . . . And I deem it a pertinent question, why is not that requirement made an inducement for attendance at an institution of learning? . . . Do we not go to colleges to learn? . . . Should we be afraid to demonstrate, in the end, that we accomplished our aim? . . . And would it not be just and fair to the public who trusts us, in the event of failure, were we to be turned down?

If there be a crying need for the multiplication of dental colleges, as would seem to be indicated by the rapid upshootings, I maintain that the quality of the instruction imparted, and the thoroughness of the tests to discover its benefit upon the classes, should be the motive behind all competition between them and should be the inspiration which starts them. But I fear the longing for imaginary honors—self-manufactured—the lingering love for the sweet sound of that now-a-days meaningless word “professor,” is the incentive for most of these divers institutions.

Who among the faculties, started within the last five or ten years, are the authors of what they assume to teach? . . . What new necessities are they able to mete out not obtainable at institutions already in existence? . . . What use or what need then for colleges not able to answer “aye” to these questions?

These are but random thoughts, roughly thrown together, but I deem them worthy of careful consideration, for within them lies the solution of a number of knotty ethical questions.

I do not ask for a “higher standard” of dental education. . . . The standard keeps pace with the progress of the profession, and 'twere ridiculous to exact more than this. . . . But higher *proofs of attainment* exacted, would have an influence

gloriously beneficial. . . . It would close many of the now useless and incapable institutions, and would give to the public a class of men who would be adornments to dentistry, and who would inspire a confidence in us as a liberal and learned profession. Our faculties, so far as I know them, are excellent men personally. . . . The institutions all aim, *in appearance*, to keep within the exactments of the national associations—just within. (Shame on them). But I fear the immortal words of the lamented W. H. V., slightly paraphrased, “The public and the profession be d—d!” is the watchword of far too many.

DR. L. P. BETHEL said that there was no doubt cause for complaint from some quarters, but many of the colleges are doing good, thorough, honest work. If some of the gentlemen here present would visit these colleges and examine their workings, I believe some of their ideas would be greatly changed. Dr. Allen speaks of entrance requirements. These requirements have not been what they ought, but if the new schedule proposed by the Faculties' Association be adopted and adhered to, it will be a long step in advance, although still more rigid requirements should be eventually adopted. Advancement must come by degrees; we cannot get everything that we want at once.

DR. A. C. McALPIN said he had seen students of dentistry in his own town, within the past few years, who were tutored by dentists and sent to college; young men totally unfit and wholly unprepared, intellectually, for the profession.

DR. J. N. WHITESIDES said we hear much from the colleges about raising the standard, but they don't do it. The crying need is to raise the standard of the colleges. Colleges are advertising institutions and many of the advertising dentists are graduates, and among the brightest.

DR. HEIVELY thinks the colleges are not careful enough in the selection of students. Preceptorage is the best preliminary training.

DR. GEO. ELLIOTT said the great fault lies with the dental faculties themselves rather than the profession. We today are asking for a law in this State to permit us to examine graduates of colleges. A student coming from a competent school should be thoroughly competent himself, and if the colleges all did their duty no such examination, from the various Boards, would be necessary.

## Chairman's Address.\*

BY R. R. ANDREWS, M.D., D.D.S., CAMBRIDGE, MASS.

IN the annual address delivered before this section at its last meeting, I gave the results of my investigations of the development and structure of the dental enamel and in a friendly way criticised some of the views of another writer who had recently written on the same subject. I have given considerable time to the further investigation of this subject preparing a paper which I read before the New York Institute of Stomatology. This paper was discussed by some of the more prominent biologists of that city, who agreed substantially with me in every point presented to you at our last meeting. The only important point on this subject I have to present as new matter is the fact unnoticed before, that some of the globular bodies that have been deposited by the ameloblast to form the enamel rods, are not homogeneous masses of substance, but are globular, having within their substance aggregations of minute spheres which for some reason have not coalesced into a mass. These minute globular bodies are held together by what appears to be an envelope or membrane, the whole forming a globule of the same size of what I call the normal enamel globule at its point of calcification. In some of my sections I have found some of these enamel globules containing the minute spheres, covering quite an area of forming enamel and they are shown in this condition as they are drawn down into the calcifying rod. They are more than likely calcified in this condition. It would appear as though it were a fault of structure, perhaps some arrest in the developmental process.

A very valuable contribution to the study of the Pathology of the Enamel, by Dr. J. Leon Williams, of London, has recently appeared in the *Dental Cosmos*. While the subject matter of the text is not altogether new, to those familiar with this line of investigation, the lucid way in which the subject is presented makes it the most notable contribution to the literature of this subject that has yet been presented to the dental profession. I can heartily agree with Dr. Williams in the conclusions advanced, and trust

\*Abstract of Paper read before the Dental Section American Medical Association, Philadelphia, June, 1897.

that we may have this work published by itself in a more permanent form, for reference and for the use of students in our educational institutions.

#### DENTAL CATAPORESIS.

The year that has passed has pretty conclusively proven that the use of dental cataphoresis, may no longer be considered as in its experimental stage so far as obtunding sensitive dentine and bleaching are concerned. The method has been found certain in its action in fully obtunding exposed pulps prior to their removal. Investigations are being made by this method which promise success in the treatment for the relief and cure of chronic cases of pericementitis by a perfect system of sterilizing root canals at the time of filling. It has been found that almost any good kind of antiseptic can be used—oil of cassia, hydrogen dioxid, chlorid of zinc and silver nitrate have all been tried with success. The method of using being something like that used for obtunding sensitive dentine. This treatment is said to allay the pain in a short time and place the tooth at once in a condition for immediate root filling. The results obtained by using silver nitrate are significant. Sections made from teeth which had been treated by a solution of silver nitrate by Dr. L. P. Bethel, of Kent, Ohio, were sent to me for microscopical examination. The highest powers of the microscope revealed the fact that the silver salt had been forced, by the current, a very considerable distance into the dentinal canal, and each canal had been completely sealed by it. As the dentine of the root is almost always infected by a putrescent pulp, which sends its organisms into the canals of the root, we can clearly see the importance of this perfect method of sterilization.

#### THE X-RAY.

The very considerable value of the X-ray as an assistance in diagnosis in our specialty, has been repeatedly demonstrated during the year that has passed. It is now possible to make skia-graphs of any part of the mouth or jaws, showing the teeth in proper relation with their alveolar sockets. Thus any peculiarity of the roots may be noted.

#### EXAMINATION OF THE MOUTH AND TEETH OF SCHOOL CHILDREN.

Within the past year there has been a movement on the part of some of the dentists of Baltimore to bring about the enactment

of a law that shall require the examination of the condition of the mouth and teeth of school children. The time of life that the school years cover is very important to the child from a dental standpoint. If the teeth are cared for during this period, the chances favor their permanent retention, and for that reason, if no other, this movement should be urged and encouraged by every intelligent dentist. The matter is of such vital importance that we should seek the co-operation of every dental society in the land to aid us in our efforts to bring about the examinations and treatments of the mouths of children in our public schools. Who better than they can recognize the justice and importance of this matter. It will save the children from sorrow and suffering, and in many cases, such supervision will triumph over disease and death.

#### CARIOUS TEETH AND TUBERCULOUS CERVICAL GLANDS.

Dr. Stark, in the *Revue de la Tuberculose*, notes the frequent association between carious teeth and enlargement of the cervical lymph glands. He examined one hundred and fifteen children with enlargement of cervical glands, and not being able to find other apparent cause for the condition, concluded that the swollen glands resulted from defective teeth in a series of cases. They corresponded in situation, time of development, and degree of enlargement, with the condition of the teeth.

The involved glands were situated on the same side as the diseased teeth, the anterior glands being enlarged if the incisors were carious and those at the angle of the jaw when the molars were involved. Toothache frequently preceded the enlargement of the glands. Dr. Stark is of the opinion that the enlarged glands are tuberculous in quite a number of these cases. He cites two cases in which he was able to demonstrate pretty conclusively that the carious teeth had been the point of entrance of the tubercle bacillus.

Case 1 was a boy, age 12, who had always been healthy and without a history of tuberculosis, had caries of the molar teeth on both sides with enlargement of the cervical glands. The glands were excised and the teeth extracted. The former proved to be tuberculous, and tubercle bacilla were found on cover-slip preparations from two of the decayed teeth.

Case 2 was a girl, age 14, with excellent personal history,

and without a history of tuberculosis in the family. The first inferior left molar was carious and there was an enlarged gland below the ramus of the jaw. The gland was removed and it showed definite tubercular disease. Between the diseased molar and the adjacent tooth and also forming the floor of the cavity in the tooth, were characteristic tuberculous nodules with typical giant cells. The latter case is particularly interesting as it seems to show that a carious tooth may be the seat of a primary tuberculous focus. With regard to treatment, the glands should at once be removed and the carious teeth should be either properly filled or extracted. As a prophylactic, the teeth should be better cared for, and Dr. Stark, with Dr. Rose, advocates the placing of all small school children under supervision.

Another interesting case has just been reported to me by a brother dentist. A boy, age 16, who was an invalid, had teeth so extremely sensitive that he could not, or would not, have them filled when they decayed. He had trouble with his cervical glands and had them operated upon, with relief for a number of years. Afterwards it was found that other glands were infected with tuberculous disease and the patient was taken to New York for treatment. The surgeon who performed the operation of excising the infected glands, insisted that all of the decayed teeth in the patient's mouth should be at once removed, giving as his reason that the decayed teeth were largely the cause of the infection.

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### Anterior Pillars of the Fauces: Etiology and Treatment.\*

BY GEORGE T. CARPENTER, M.D., D.D.S., CHICAGO, ILL.

It is the dark red, or reddish-blue color, which is a venous stasis of the pillars and uvula and their shining sticky mucous surfaces that I wish to consider. On investigation I find that in a large number of persons visiting my office for dental services, this abnormal condition is present. These parts are easily brought in view by having the patient breathe through the mouth. The patients do not complain of a sore throat, but of a fetid breath and sometimes a disagreeable taste in the mouth. The venous

\*Abstract of paper read before the Dental Section, American Medical Association, Philadelphia, June, 1897.

stasis of the pillars action is an essential, the etiology of which is not found in the erupting molar, will be found in the tonsil or post nares. The tonsil may have little or no inflammatory action and the crypts may or may not be filled with a cheesy exudate, and still their sluggish condition will produce a foul-smelling secretion and absorption by the lymphatics will follow. Also stenosis and chronic catarrhal conditions of the post nares will produce a dropping in the pharynx and keep the pillars bathed with a foul secretion, which will taint the breath and produce, through absorption, an abnormal appearance of the pillars.

Treatment consists in antiseptic gargles, of which borolyptol, either in full strength or diluted, is one of the best, also an alkaline and antiseptic wash, as Dobell's solution, used for a gargle or spray for the throat and spray for the nose. The tonsillar condition may be stimulated with silver nitrate, or the electric cautery may be used to advantage. When catarrhal conditions exist any stenosis should be corrected, and the nares and fauces cleansed every night and morning with an alkaline spray. In addition to this, two or three times a week iodin solution, two to ten grains to the ounce of water, with iodid of potassium and glycerin, will be found advantageous.

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### The Need of Dental Instruction in Medical Schools.\*

BY DR. EDWARD BRANIGAN, BOSTON, MASS.

THERE is great need of dental instruction in medical schools. Physicians should know more about the teeth than they do, and when medical students are given a better knowledge of the teeth and the many disturbances they cause, then will medical science do a little more for humanity than it is now doing. In this paper I shall confine myself to the narration of a few of the more common instances of the mismanaged treatment of diseases caused by the teeth. Abscesses caused by pulpless teeth are still poulticed and opened on the face by medical men. I have seen many hundreds of these. Of course this does not effect a cure and in the course of time it is bound to dawn upon the patient, if not

\* Abstract of paper read before the Dental Section, American Medical Association, June 1897.

upon the doctor, that dental assistance is needed. People are still being stabbed in the face and neck because a third molar kicks up a fuss in trying to get up into the mouth where it belongs. The medical treatment for these simple abscesses is sometimes varied a little. The sufferer may be kept in bed for a time with temperature and pulse watched, and medicine changed at intervals, according to the symptoms. This sort of thing happens sometimes when the old tooth-root, at the bottom of the trouble, is so loose that the owner could pull it out with two fingers. Pus from an abscessed tooth is frequently discharged into the antrum. The extraction of the tooth, followed by proper treatment, would rob the medical profession of many patients who are supposed to suffer from and are treated for catarrh. Serious throat diseases are frequently caused by pulpless teeth, and sometimes by unerupted or retained teeth. I find that not all throat specialists even are aware of this. A more intimate knowledge of other specialists regarding the teeth would be of great value; for instance, to aurists. Severe and painful inflammation of the ear, caused by decayed teeth, is common. The renewal of a filling from a pulpless tooth has, under my observation, made a number of sufferers from aural treatment happy. Unerupted wisdom, and sometimes supernumerary, teeth, are the cause of many obscure ear troubles. Oculists are now tracing a variety of diseases back to the teeth. Tumors of the nose may be caused by a dead tooth-pulp. Treatment of the tumor without a knowledge of the cause, is not calculated to make the owner of the nose happy. The victims of the so-called neuralgia, who, after weeks, months, and even years of anti-neuralgic drugging, die or find relief at the hands of someone who knows something about the teeth, are countless. Thousands of people today are being drugged for neuralgia who are really suffering from some form of dental irritation. The authorities in charge of the management of hospitals should know more about dentistry, and the medical directors of public institutions can find a vast amount of good work ready for them when they realize the importance of having dental service given to those in their charge.

### Silver and the Silver Salts, and their use in Dentistry.

Though modern surgery has turned from antisepsis to asepsis, the former is by no means superfluous. Asepsis cannot be obtained in many conditions in which the external circumstances are such that microbial infection cannot be prevented, or where it has already occurred. Moreover, antisepsis often gives us quicker and better results than does asepsis. Especially is this the case in the mouth, the field of our special labors, which is a perfect culture oven of exogenous and endogenous micro-organisms, and where aseptic procedures are entirely inapplicable. We dentists are compelled to rely on antiseptics; and if I propose a new one to you, and recommend it most warmly, it is because of the good results that I have obtained with it in various departments of our specialty.

The ideal antiseptic must possess the following properties: It must be harmless, non-poisonous and non-irritating; it must be fatal to all pathogenic spores and microbes; it must have no deleterious or destructive effect upon the tissues; it must be in a form that renders its application possible in the most difficult localities; and, finally, it should be sufficiently far-reaching in its effects to penetrate the deeper tissues and destroy the germs that may have penetrated to them. None of our previous antiseptics fulfil these conditions. Crede believes that two new ones, the Citrate of Silver and the Lactate of Silver, really do so; and his conclusions are confirmed by those of Halsted, Beyer and others. His bacteriological and clinical experimentation in the Carola Hospital of Dresden have given most surprisingly good results.

We dentists are well aware of the fact that the precious metal, in proper form, hinder the growth of the schizomycetes; that gold fillings are more resistant and more durable than others. I, with Miller, ascribe it in part at least to this fact, though something may be due to the greater care with which fillings of the precious metals are made. Gold plates are better borne by the oral mucous membrane than those made of hard rubber. It seems to be proven that various metals, more especially mercury, silver, gold have antiseptic properties; whilst zinc, lead, and iron seem to be quite powerless in this regard. The laboratory experiments and clinical researches of Crede and Beyer were so entirely satisfactory that I resolved to try the new antiseptics in dental work. In the sterilization of root sinuses I thought that they would be specially useful. My trials were made upon teeth with freshly killed pulps, as well as upon those in which the pulps had become gangrenous, and include about 100 cases. And I may state at once that my hopes were not disappointed.

The results that I have obtained during the last half year have been entirely satisfactory to me, and I can recommend these preparations to my colleagues in the very warmest manner.

I directed all the patients that I treated with the silver salts to return to me at once, as soon as any pain occurred in the teeth that had been treated. Up to the time of this present writing only three have reappeared with periostitis; and in two out of these three the defects in the molars were distal and difficult to get at.

My method of root treatment is the following: I open the pulp cavity with a suitable trephine, and if the pulp is gangrenous, clean it out as thoroughly as possible with a thin probe. Then I thoroughly and repeatedly inject out the root canal with a freshly prepared and dilute solution (1-2000) of the Lactate of Silver. Then I apply the rubber dam, dry the cavity carefully with cotton, and then thoroughly with the warm air injector; to the completeness of which procedure I attach the greatest weight. For I believe that even if dead nerve tissue remains behind, further decomposition and the development of the gases of putrefaction cannot so readily occur if all moisture is thoroughly removed, and the mummification of whatever of nervous tissue is left behind is effected. Here the powdered Citrate of Silver is of especial value, since it not only permanently disinfects the decomposition products that remain, but acts as a dessicant also in consequence of its powdered form. As is well known, the difficulty in the sterilization of the root canals depends on the difficulty of thoroughly applying the antiseptic to it. I believe that it is best done by applying the Citrate through an insufflator, to the nozzle of which a rubber tube with a very small orifice is attached; this permits the application to be made to all the sinuosities even of the distal canal.

The pulverization is fairly forcible, and if the lumen of the canal is sufficiently large, I do not doubt that the particles of the drug reach the very ends of the sinuses. If the insufflator does not seem to have effected this, I apply the powdered Citrate to the depths of the canal on a thin probe.

Recently killed pulps I usually fill at one sitting, simply dusting in the Citrate after opening the cavity with a sterilized bur and filling with tin or gutta-percha in the usual manner. When the root canals are putrid I deem it necessary to make two to three applications and insufflations of the Citrate or the Lactate before proceeding to the permanent filling. Is surprising to see in most cases that after the first introduction of the silver salts the odor of decomposition entirely disappears. I have seen no discoloration of the teeth in the cases that have returned to me; it is true, however, that they were all molar cases. Only the cavities were colored black. Irritation symptoms after the applications were never noted.

I do not claim that this method of the treatment of roots is the only proper one; for there are almost as many different methods as there are practitioners of dentistry. But with these antiseptics I have formulated a suitable and effective method system of treatment.

In conclusion let me state that I have used the silver preparations in various other diseases. I have used the grey silver gauze in one case of empyema of the antrum of Highmore, and as a tampon for the hemorrhage following extractions, and also the dilute solutions as gargles in stomatitis; and I have obtained like satisfactory results with them.

The comparatively small number of cases over which my experience extends are too few to base a final judgment on. But the good results certainly enable me to recommend that these silver salts be extensively experimented with and tried by others, and I should be glad to stimulate those of my colleagues who have not yet used these antiseptics to do so.—*M. Hille, in Monatssehrift fur Zahnheilkunde.*

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## BRIEFS.

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**Whitewood for Crown Swaging.**—Dr. J. H. Beebee thinks the best kind of wood for swaging up the crown in is whitewood; it is much better than pine.—*Cosmos*.

**Does Not Favor Seamless Gold Crowns.**—Dr. J. H. Beebee does not favor seamless gold crowns for he does not think it possible to fit a gold crown made in one piece.—*Cosmos*.

**The Teeth in Tubercular Diathesis.**—In the tubercular diathesis, the teeth are remarkable for their early whiteness, but in the strumous diathesis, which is so nearly allied to the tubercular, the teeth are usually of large size and good form.—*J. E. Gemmell, Record*.

**Congenital Teeth.**—Dr. Fosbery (*British Medical Journal*) reports a case in which a left lower central incisor was observed projecting above the gum on the morning following the birth of the child. The mother noticed that the child bit when first put to the breast; the next morning the tooth was apparent.

**Cause of Malformed Teeth.**—Mr. Hutchinson considers that malformation of the permanent teeth, except in cases of hereditary tendency, are much oftener due to some transitory attack of inflammation of the alveolus during the first year of the child's life than to any interference with the nutrition of the whole body.

**Danger Signals.**—During the administration of ether the most alarming danger signals are sudden pallor of the face, dilatation of the pupils, and darkening of the blood. When these symptoms present themselves the anesthetic should at once be withdrawn and resuscitating measures instituted.—*Hearn.*

**To Prevent Plaster from Running Down the Throat.**—In taking impression have a mouth mirror just within reach, and if you do get excess of plaster down on soft palate, reach down with mouth mirror, and one quick upward scrape, and your patient will be feeling comfortable.—*E. A. Randall, Dom. Journal.*

**Formed a Battery.**—Mr. J. G. Wallis mentioned a case where a large amalgam filling in the lower bicuspid came in contact with the gold band of a vulcanite denture. So long as the patient had the plate in the mouth he always had pain. It was not merely in removing or replacing it, but as long as he wore it.—*Dental Record.*

**Arrest of Development a Factor in the Causation of Caries.**—I have seen the arrest of development as a starting point of decayed teeth manifested in nursing mothers, but not until their strength has been overtaxed, and the general health has begun to suffer from the malnutrition caused by an excessive drain.—*J. E. Gemmell, Dental Record.*

**The Hypodermic Syringe.**—I will risk the assertion that some who do not yet know that after use, if the syringe is placed under water with the piston withdrawn and the piston is then forced down again, a sufficient quantity of water will be pumped in above the piston to keep the instrument in working order for many days at least.—*Parells.*

**Packing of Pink Rubber.**—Dr. Beebee's method is to set the case rather high so when the cast is put on there will be quite a distance from the upper edge to the parting of the flask. He covers this with a solution of pink rubber and a sheet of pink rubber is placed around this and a little way down between the teeth.—*Cosmos.*

**A Good Engine Cord.**—We are all aware that dealers send us with our engines very poor engine cord. That is so easily obtainable that it is within the reach of all at very little expense. The cord I have reference to is used for lacing-cord for ladies' bicycles, and can be obtained at all the bicycle stores. It is nicely woven, and the expense is about one cent a yard.—*Dr. Gaylord, Cosmos.*

**A Method of Fixing Handles to Surgical Instruments.**—M. Charbonneau, in *Archives Nationales*, gives the following method for fixing handles to surgical instruments:—"Prepare a mixture in equal parts of

powdered pumice and of finely powdered resin, introduce the necessary quantity of this mixture into the handle, heat the tang of the instrument, and push it home while warm." Old pieces of corundum wheels, crushed to a powder, he finds is nearly as efficacious as the pumice and resin.

**To Form a Stable Solution of Eucaine.**—Eucaine must be boiled to make a stable solution in water or liquid vaseline. About 1 part to 19 is best for general use. The manufacturers say that 9 per cent is about as strong as a clear solution will stand; when stronger the eucaine separates after a short time.—*Dental Review.*

**Low Voltage and Light Resistance.**—Low voltage and light resistance gives better results and gives them more quickly than high voltage and high resistance, and I think that a great many failures in cataphoresis may be attributed to operators trying to obtain results by using high voltage. In a number of cases where high voltage gave no result, recourse to a light current gave success in a short time.—*N. M. Chitterling, in Items.*

**Treatment of Shock.**—In case of shock, a hypodermatic injection of one-twentieth grain of strychnine should be immediately administered, and repeated every half hour until three doses are given, then every four hours until the patient recovers from the shock. Recovery at any moment is of course, the signal for discontinuing the strychnine. In chloroform narcosis an injection is given immediately prior to the administration of the anesthetic, and the same rules followed as in the case of shock.—*Dosimetric Med. Review.*

**Pericementitis from Phosphoric Acid.**—I read somewhere that a dentist secured stronger adhesion of his oxyphosphate of zinc filling, by first painting the walls of the cavity with the liquid. I thought this a capital idea, and having a root to crown (a good, healthy root, which for ten years had been kept sweet and dry by a gold canal filling), I applied the method. Result: A raging pericementitis, which lasted several days. The acid had evidently penetrated the foramen before the filling material had a chance to absorb it.—*S. J. Spencer, in Items.*

**Paralysis of Arm from an Impacted Carious Wisdom Tooth.**—Patient, aged 24, was quite unable to use the left arm, to raise it, or to grasp with the hand; she could not hold her fork at meal times nor use the arm when dressing. There was constant pain. On examination of mouth, the left lower wisdom was seen, having come through the gum, but lying low down and horizontally placed, the crown pressing against the second molar; it was carious. The tooth was extracted and the pain and paralysis vanished.—*J. E. Gemmell, Dental Record.*

**Extracting Difficult Roots.**—I have found the following method of great value in extracting roots which were decayed or broken off above the margin of the gum. With a B size How twist-drill in the engine, drill into the pulp-canal as far as you can with safety; then tap with the same size How screw-tap. Then screw in a bright-metal post, following it with the chuck until it touches the root or approaches as nearly as possible. Now take hold of the chuck with your forceps and extract with as straight a pull as possible. By this method all laceration of the gums and injury to the alveolar process is avoided.—*A. J. Butler, in Cosmos.*

**A Good Solder.**—Dr. Beebe recommends the following as a superior solder:

Copper (pure),	- - - - -	53 parts.
Silver	" - - - - -	25 "
Brass pins,	- - - - -	12

Melt silver, add copper, and then add pins, and, pour at once. This metal he uses to make solder of any degree desired, using pure gold, such as filling scraps. If it is a high-grade, like 18 or 20 carat, he reduces slightly the amount of the alloy and replaces the deducted weight with pure silver.—*Cosmos.*

**Blindness from Crowding of the Teeth.**—A boy, age 11, complained that he wakened one morning to find he was blind. Previously, and on going to bed the night before, there was nothing wrong with his eyes. Examination.—The pupils were dilated, fixed, not influenced by light; could not tell light from darkness. The suddenness of the attack pointed to functional disturbance. Several causes were looked for, but examination of mouth showed crowding and wedging of the teeth together. Two permanent and four temporary molar teeth were extracted. The same night he could distinguish light from dark, and next day could make out objects, and, in a few days, sight "was restored." He had no other treatment.—*J. E. Gemmell, Dental Record.*

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### New Publications.

ENGLISH SYNONYMS, ANTONYMS, AND PREPOSITIONS. By James C. Fernald, editor of synonyms, antonyms, and prepositions, in the Standard Dictionary. New York: Published by The Funk & Wagnalls Co., 1897. Price, cloth, \$1.50.

This work is a most excellent one for everybody, being by

far the best work of the kind published. The book treats within the 375 pages more than 7,500 synonyms, 3,700 antonyms, and the reader will find much help from the indication of the correct use of prepositions, the misuse of which is one of the most common of errors, and one of the most difficult to avoid, while their right use gives to style cohesion, firmness, and practice.

It has been the study of the author to give every definition or distinction in the fewest possible words consistent with clearness of statement, and this not merely for economy of space, but because such condensed statements are most easily apprehended and remembered.

The method followed in the book has been to select from every group of synonyms one word, or two contrasted words, the meaning of which may be settled by clear definitive statement, thus securing some fixed point or points to which all other words of the group may be referred. The great source of vagueness, error and perplexity, in many discussions of synonyms, is that the writer merely associates stray ideas loosely connected with different words, sliding from synonym to synonym, with no definite point of departure or return, so that a smooth and at first sight pleasing statement really gives the mind no definite resting place and no sure conclusion. One of the most valuable features of the book is the defining of the slight shades of meaning of various words of the same group, and illustration by means of examples.

It is neatly printed and bound, and is a book that should be in every library.

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## SOCIETIES.

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### Northern Iowa Dental Society.

THE third annual meeting of the Northern Iowa Dental Society, will be held at Mason City, Iowa, September 7, 8, 9.

Arrangements already made indicate an interesting and profitable meeting. A cordial invitation is extended to all members of the profession to meet with us.

Wm. H. STEELE, *Sec.*,  
Forest City, Iowa.

**Dental Section American Medical Association.**

THE following officers were elected for the ensuing year : Dr. George V. I. Brown, Duluth, chairman ; Dr. E. S. Talbot, Chicago, secretary. Executive committee : Dr. J. L. Williams, Boston ; Dr. M. H. Fletcher, Cincinnati, and Dr. A. E. Baldwin, Chicago. The next meeting will be held at Denver, Col., June, 1898.

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**Bi-State Dental Meeting.**

THE Bi-State dental meeting of the South-western Michigan and Northern Indiana Dental Societies, will be held at Benton Harbor, Mich., Tuesday and Wednesday, September 14-15, 1897.

F. H. ESSIG, *Secretary,*  
South-western Dental Society, Michigan.

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**Michigan Dental Association.**

ONE of the most interesting and largely attended meetings in the history of the Michigan Dental Association, was held at Battle Creek, Mich., June 8th, 9th, 10th. The following officers were elected : President, E. T. Loeffler, D.D.S., of Saginaw ; 1st Vice-Pres., H. T. Harvey, D.D.S., of Battle Creek ; 2nd Vice-Pres., H. C. Raymond, D.D.S., of Detroit ; Secretary, S. M. Fowler, D.D.S., of Muskegon ; Treasurer, Geo. H. Mosher, D.D.S., of Jackson.

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**Pittsburg Dental College, Department of Western University of Pennsylvania.**

COMMENCEMENT exercises were held March 25th, 1897, in the Alvin Theatre. Number of matriculates for the course one hundred and nineteen. Address to the class was delivered by the Rev. J. C. White, D. D., Sec'y of the Board of Trustees of the University. The degree of D.D.S. was conferred by Chancellor Holland upon the following graduates : Adolph T. Bowers, Pa. ; Geo. Leon McFarland, Pa. ; Henry H. Redmond, Pa. ; John H. Sloan, Ohio ; Nevin H. Snyder, Pa.

## OUR AFTERMATH.

MUST HAVE HAD TEETH EXTRACTED.—If the devil punishes the ordinary harmless liar, what will he do with the dentist who advertises to extract teeth without pain?—*Med. Era*.

REMOVAL.—Dr. G. Lenox Curtis, the well known specialist in oral surgery, has moved to No. 7 W. 58th St., New York city, and opened a sanatorium for oral and facial diseases.

ARRESTED AND FINED.—A dentist has been arrested and fined in Berlin for announcing himself, on his office sign, as a "doctor of dentistry" from an American college. The court declared that the law prohibited such display of foreign dental titles in Germany.

NOT A PROFESSIONAL MAN.—The dental graduate who neglects to occasionally revisit his college, who fails to keep in touch with his professors, who forgets his classmates and who avoids associating with his fellow-practitioners, and keeps aloof from his state and local society gatherings, can hardly be considered a professional man.—C. L. GIBSON, *Cosmos*.

EXHIBITION OF COMPARATIVE DENTAL ANATOMY SPECIMENS.—The Section of Anatomy, Pathology and Surgery, will make at Old Point, this August, the largest exhibition of specimens in comparative dental anatomy that was ever got together. The specimens will be gathered and arranged and systematized under the direction of Dr. W. C. Barrett, the work being done by Ward's Natural Science Establishment, in Rochester, N. Y., and there will be representative specimens in all the classes and orders, and all the principal species and even families of the vertebrates. There will be fossils from the tertiary age, reptiles from the mesozoic, and even specimens from the Devonian, that will illustrate the derivation and development of modern mammalian dentitions. It will include a number of hundred of the representative dentitions of all orders, and will be properly arranged for exhibition in a large room to be set aside for that purpose by the Ex. Com. of the A. D. A.

MYSTERIOUS LANGUAGE.—Language was given to us—according to Tallyrand—to disguise our thoughts. A writer in the *Dental Digest* may simply teem with thoughts, but he has disguised them by his language in such a way that we candidly confess that after reading his paper, the only effect produced is one of bewilderment. What are we to make of the following?—"This visplastrix of organic composition is a sovereign factor in all promethean display, though of such subtle yet positive character that its realms are shunned and neglected through fear and dread of incomprehension by those who have wandered by aid of the Diogenesic lamp through the mysterious labyrinths of this obscure primogenial phase, and they have at last failed to hand out to the hungering student that pabulum of mental nourishment for which our souls do most thirst and our lives grow weary and wan in under the dismal aureola of savantic despoil." Our lives "grow weary and wan" with this "pabulum of mental nourishment."—*British Journal*.

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## CONTRIBUTIONS.

**"To What Extent and When Are we Justified in Using Cata-phoresis?" Is There Danger of Injuring the Dental Pulp or Other Tissues by Its Use?\***

BY H. T. HARVEY, D.D.S., BATTLE CREEK, MICH.

THE history of the discovery of the principle underlying the cataphoric method presents some features of more than ordinary interest. Especially does it show thereby, that great study together with constant effort is required, and then only by slow progress are tangible results obtained. As has been said, "No great truth springs into completeness from one thought in an instant, but rather by an evolutional process, in which its possibilities are gradually developed and utilized for the benefit of humanity," and from that ever-flowing spring of thought and genius has been handed down to us the great principle of methodical cataphoresis. It is by no means new. Members of the medical profession experimented with electro-chemical anesthesia as early as 1833, and quite extensive experiments were performed both in medical and dental surgery in 1859. The results of experiments at that time were defined as follows: voltaic narcotism was attended with some eminent successes, and also with

\*Paper read before the Michigan State Dental Society, June, 1897.

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some singular failures, and that all objections to this method were removable.

It seems that the essential features of cataphoresis, after remaining in a dormant state for half a century or more, is resurrected, placed in a different aspect, or new light, and its practical utility brought forth.

The principal factors responsible for the resuscitation of cataphoresis is the intense interest manifested in utilization of electricity in dentistry. The therapeutic and analgesic properties of cocaine salts, and the constant demand for the alleviation of pain caused our patients in the more severe operations in dental surgery.

It is not my intention, at this time, to discuss the ancient basic features of cataphoresis or detail its recent origin. This has been very ably placed before us, and I will now devote my time to cataphoresis as we find it to-day.

We who are interested in cataphoresis have now had the practical experience for a year or more of its use in our several practices, and no doubt, all acquiesce, though our experience has been limited, we have used it sufficiently to admit of some merit in the principle involved in its use. There can be no doubt, however, but that there is room for improvement in devices for managing the electric current, and a decided need of an extended investigation in producing more effective medical solutions suitable for therapeutic treatment. It is not by any means conceded or demonstrated that cocaine is the best drug to use as a dental obtundent, and there is much reason to believe that there is great merit in other drugs if developed.

Promoters of medical and dental science fifty years ago, with the salts of cocaine unknown, produced wonderful results, and yet they were confronted with one of the great obstacles that we ourselves are unable to meet, that is imperfect electrical devices, and by that I mean that the problem of a continuous current, whereby it remains unbroken from first application until complete anaesthesia is produced.

The whole field of dental applications of the cataphoric principle is still in its infancy; diligent search for a complete realization of all its possibilities is required.

To what extent, and when are we justified in using cataphoresis? Surely you will agree with me, when I say that not all patients we operate upon demand dental obtundents.

The question is, what class of patients demand cataphoric application? To what extent should we go with those classes? How shall we differentiate between them?

A thorough study of temperaments is imperative in treating patients with cataphoresis; we should also understand thoroughly the maximum and minimum amount of electricity each case requires, and will tolerate, and yet, produce thereby the desired anaesthetic effect.

We should know what medicinal solutions are indicated in each case, where application is necessary. There are principles to be followed; positive rules to be established, studied and observed in order to co-operate with all other advancing, improved methods and devices, thereby rendering a perfectly successful operation possible.

While in attendance at the annual session of the American Dental Association at Saratoga, last August, I was greatly interested in hearing related some experiments which an inventor of an electrical dental apparatus, and an expert of a New York life insurance company had made, testing the capacity of different individuals as to the degree and amount of electricity they would tolerate, and what was requisite to produce contraction of various muscles. Brothers would vary from twenty to thirty-five volts. Father and daughter varying the same degree. Mother and son would require each an equal amount. The results of their experiments forced them to the conclusion that only by various tables of temperaments, with general diagnostic features could a safe and reliable rule be incorporated.

Another important and great obstacle is, time required in some cases, although I believe a skillful operator can, to some extent overcome this objection.

When are we justified in using a dental obtundent for excavating dental decay? I must define that question by my experience. I ascertain from a temperamental knowledge to some degree, what temperament the patient I am to operate upon possesses. If undecided by a casual glance, I test sensitivity of tooth with my excavator. If I find hypersensitive condition I make cataphoric applications in the usual manner. From records made in my practice in the past six months I was required to use an obtundent in 25 per cent of the cases operated upon; out of one-quarter of the cases operated upon, in which cataphoresis was

used, twenty-seven per cent of those cases were absolutely successful, in seventy-three per cent of the cases, pain from mild to intense, followed the application of electricity. I also found that all cases that proved satisfactory were of sanguine or sanguinobilious temperament, and the patients who complained of intense and at times intolerable pain ensuing after the application of the electrical current, the minutest fraction of a volt, were those dark haired, black eyed, nervo-bilious-tempered individuals. They possess teeth so sensitive that they respond to the slightest fluctuation of the current. I believe that could we produce a non-fluctuating, non-breaking current that by gentle, continuous applications of electricity, the most pronounced type of hypersensitive teeth could be reduced to perfect anæsthesia. With all other classes I have no trouble. There is in some cases that disagreeable sensation, as some choose to term it, upon application, and upon each succeeding increase of voltage of the current.

What current and to what extent should we use cataphoresis, must also be regulated by one's experience in cataphoric operations. To my mind the only safe and satisfactory one is a primary and secondary current; a commercial current is always unsafe, danger from cross wires; and is very unsteady, and I know of many prominent dentists who used a commercial current for their cataphoric operations, and found the current too unsteady, and also unsafe, and have placed a battery for use in their offices.

To what extent we should use this method, each must determine. Should every case indicate the application of cataphoresis, just to that extent should he use it. As to voltage required to produce structural anæsthesia, it usually requires from twenty-five to forty volts, no more should be applied, and in a majority of cases twenty-five volts will suffice. Fifteen volts is the minimum amount. I have been able to produce total anæsthesia. From ten to thirty minutes are required usually to anesthetize a tooth.

I have also used Prof. Morton's Electrode No. 1 in lancing alveolar abscesses and also his No. 2 Electrode (deepest) in extraction with excellent success.

Is there danger of injuring the dental pulp or other tissues by the use of cataphoresis? I find by investigation that about ninety-five per cent of the cases where the cataphoric application

is made, that the tooth structure is much more sensitive than before, and where metallic fillings are placed in immediate contact with the structural walls of the cavity, there is greater danger from internal shocks to the pulp than there would be ordinarily where there is no cataphoric application made.

I think that with an intermediate non-conducting lining in all cavities treated by this method the danger from this source would be reduced to a minimum. I invariably follow the practice as outlined. I have learned of only one devitalized pulp resulting directly from the electrical current, and that to my mind may have been diseased, and the current or volt of the current indiscriminately used.

There is reported a case of toxemia or toxicosis by Dr. Henry I. Moore, of Frankfort, Germany, during an operation of pulp extirpation and produced toxicosis by a surplus amount of cocaine, it however serves to illustrate the power of cocaine upon the more delicate tissues, and why not upon the structure of a tooth.

I have been unable to discover any serious after-effects from the use of cataphoresis where the necessary precautions have been observed, as outlined above.

And could we apply the electric current without producing those painful sensations I would think we had reached the mecca in dentistry, therefore, as I have mentioned before, the results thus far attained, while encouraging are doubtless capable of improvement. I use Wheeler's Fractional Volt Selecter, with thirty-cell battery and guaia-cocaine as a medicinal solution.

#### DISCUSSION.

DR. MORSE: I had a cataphoric apparatus at a very early period of its use in its present condition. I have been troubled with obtaining a desirable current throughout my entire experience, and the result is that I have not had as much service from it as many of you present. I attempted to use a storage battery of ten cells with light plates and for a time they were very successful, but became short-circuited and were soon exhausted. I then attempted to use primary battery cells in connection with a volt selector made for 110-volt circuit and with that I have not had the success I should have had. The success I have had in some cases has been very pleasing and in other cases I have had to

spend so much time that I have thought that we were hardly justified in the result gained, considering the time expended unless very well remunerated. Hyper-sensitive dentine is certainly the case indicated for the use of cataphoresis. There are a great many cases, as we all know, where it is not necessary to use an obtundent. In a talk I had with Dr. Custer, at Grand Rapids last year, he related some of his experiences. His theory of the reason why we did not get quicker and better cataphoric action in the use of cocaine by the aid of electricity, coincided quite-thoroughly with my own observations. The tubuli extend from the pulp in an outward direction and they end in the cavity; uncovered they will be the best conductors of electricity and the electrical current and will carry the medicine that is placed in the cavity through those tubuli to the pulp. The tubuli that extend into the dentine about the cavity, and whose outer ends were covered will not receive and conduct the current in the same manner. The drug will be carried to the pulp through the open tubuli and the pulp will be anaesthetized at the point where the tubuli entered the pulp chamber and it would be necessary to anaesthetize that pulp sufficiently so that the tubuli connected with the pulp and extending through the dentine around the cavity would be anaesthetized before we could make lateral excavations or under-cuts, or drill in that direction. I think this is the reason it requires so long to get anaesthesia in certain cavities, particularly in those portions where we wish to obtain under cuts.

QUESTION: About how long a time does it generally take to obtain anesthesia?

DR. MORSE: It varies a great deal. I have had satisfactory results in twelve minutes and even shorter time than that. And again in twenty minutes I have had no satisfactory results; but after the first application by removing the intervening decayed dentine, I think it hastens the operation and I have had better results in making two or three applications, in making partial excavations and then reapplying. In regard to being unable to determine the amount of current to be used upon a patient I have not been able to find any method by which this could be done. From my own observations and reading I am led to believe that it is impossible to determine by any outward indication the length of time, the amount of current, or the strength of the solution necessary to produce anesthesia.

DR. BLACKMARR: I am surprised that Dr. Harvey is not as enthusiastic over this subject as he was last year. In the use of cataphoresis it seems to me it is like everything else we use; it requires judgment and tact. It reminds me of the saying of an eccentric uncle of mine, "It beats all how many times a day you can use good, common sense." The most success I have had was with exposed pulp. I have had success in obtunding decayed dentine and irritable dentine. I have a case in mind, shortly after I got the apparatus, of a young lady who broke off three incisors, exposing the pulps. I applied cocaine crystals in solution to have it as strong as possible and in fifteen minutes I had the first pulp removed, perfectly painless. I took the three out in forty-five minutes.

QUESTION: How long do you think it would have taken without cataphoresis?

DR. BLACKMARR: I don't know, but I am sure I could not have done it without the apparatus. She was a very sensitive patient.

DR. HALL: I recently saw a patient immediately after the use of the cataphoric appliance on a lower bicuspid, the lip on the inside was black, and a spot on the outside of the cheek looked as though it was pretty well blistered. I would like some of you to tell me the cause.

DR. SIDDALL: How much current was used?

DR. HALL: On the first application the negative pole was applied to the cheek underneath the rubber dam. The twelve cells were used and in about twenty minutes the patient said she felt no effect of the current at all. The twelve cells were turned on again and the resistance used. The tooth being still sensitive, the patient felt no inconvenience; then all the resistance was removed and she said there was a sort of tingling sensation on the cheek, not enough so that she felt alarmed, and did not know the effect until after the apparatus was removed.

DR. SIDDALL: I think it was the current. I have made experiments upon myself and have never been able to use more than six or seven wet cells and eight dry ones was the limit. I am using the thing to avoid pain.

DR. FRITZ: I may be a little out of order, but I believe Dr. Blackmarr could have operated on those three pulps in less time with equally good results with a two or three per cent solution of

cocain. I had, about a year ago, a similar experience, not quite so favorable. I don't think I took over fifteen minutes for the operation and it was painless.

DR. LOEFFLER: We want to know the actual result from the application of cataphoresis and so much depends upon the patient. I remember a case that was brought up at our local association by one who has had, in a measure at least, wonderful success with the apparatus. He had made every effort to make a painless operation and after tiring himself out for half the afternoon, and the patient showing no indication of any sensibility, to his utter disgust upon asking him how he liked the operation, the patient replied, "It hurts like the mischief." It seems a great deal of the result we get, depends upon the veracity of the patient.

DR. RAYMOND: I am surprised that Dr. Harvey did not show more enthusiasm in regard to cataphoresis and that he has had so large a percentage of failures. One year ago I commenced using Dr. Custer's apparatus. I have used it quite a good deal since and my percentage of failures has been much less than Dr. Harvey's. I am surprised at Dr. Blackmarr's statement that Dr. Custer said that in five years' time he did not suppose there would be one of his appliances in use. It is different from his statement to me last summer. He said he did not think you could take a case to him he could not be successful with. Dr. Harvey said the minimum amount of voltage was fifteen. It may be so with the Wheeler. I had forty used on a tooth of mine and stood it very well. I use Dr. Custer's and you cannot use more than twenty. You can use forty with success, but I have never gone beyond twenty. I have heard that those using the Wheeler have known their patients to jump a little as though from a break in the current. I don't know the difference in them. I have no doubt but that cataphoresis has come to stay and will be used by careful men who select their patients and know how to use it. If you have an inflamed pulp, it always causes pain as soon as the application is made. If you only have an exposure, you nearly always have success with it. You ought, if possible, to cut away the leathery portions of decay, before the application, as that is a non-conductor. Dr. Custer recommends cutting away the enamel so you can send the current through the tubuli, and it will take effect very much more quickly. I have

used both cocaine and eucain. A saturated solution of cocaine has given the most beneficial results.

DR. FIELD: I use a Custer apparatus with a direct current. I think the current from a battery would be more satisfactory. The first time I ever used cataphoresis, an agent came to the office and wanted me to try his apparatus. I told him to take it up to the college as I would have a better chance for clinics there. He took it there and set it up. You want sensitive dentine or pulp if you are to be able to show anything. He brought the apparatus up there and I started it on the four percent solution. I tried that on one of the students. He said his teeth were extremely sensitive and had one of his teeth filled with gutta-percha. I had that removed. It was extremely sensitive. We used the three per cent solution for about twenty minutes. We found part of the tooth obtunded and part of it not. I then tried four per cent solution for thirty minutes and we could then cut as much dentine as we wanted to. I cut close on the pulp and there was no pain whatever, and he had never had any ill-effect from it. I must say that my apparatus has been very satisfactory to me. I am surprised that a man like Prof. Taft will say that in five years' time it will not be used. I think ten will be used where one is now.

DR. BLACKMARR: That was Dr. Custer's statement to Prof. Taft. Probably a confidential one.

DR. HARVEY: I think one needs to use a good deal of hypnotism when applying cataphoresis. I think hypnotism has a good deal to do with the result.

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### Point of Contact.\*

BY R. W. MORSE, D.D.S., LANSING, MICH.

THE normal set of teeth in the mouth of a human adult offers sixty points of contact which represents about three-fifths of the probable points at which caries attacks the teeth. Why is it that the teeth decay more at this point than others? It is due to the fact that at this point and just away from it toward the cervical margin, the surface is not self-clean-

\*Paper read before the Michigan State Dental Society, June, 1897.

sing, and there becomes attached to the teeth a thin film of agglutinated substance, made up principally of micro-organisms. The food in process of mastication does not disturb them. The brush passes over the buccal and lingual surfaces, and still they remain. The tooth-pick will dislodge some, but it is necessary to use dental floss, or something of that nature to polish and scour them off. If all surfaces of the teeth were kept cleaned of this accumulation, we would soon find that our profession was considerably crowded, but the laity have not been sufficiently drilled on this method, and those who have been instructed do not find the time to do it thoroughly, hence we are called upon to correct the results of their defiance of Providence. This agglutinated mass of organisms secretes acids; at first attacks the cement that binds the enamel rods together, on account of its not being as dense as the enamel rods. Then the rods themselves are decalcified, and gradually disintegrated, leaving an opening into the surface. In such openings as fast as found the microbes establish themselves, and from now on have it all their own way unless the cavities are scientifically stopped by some member of our profession. It is our duty to our patients to instruct them in the use of dental floss and brush to thoroughly cleanse the teeth. Abrasion is the only means by which this can safely be accomplished, and then it is necessary that it should be attended to religiously. Mouth-washes aid in making the microbes uncomfortable but do not remove them. Careful brushing and the use of dental floss in connection with mouth-washes is the best method of attack.

But the thing that I wish to call attention to particularly is the restoration of this point of contact by filling. Dr. Black in his talk before the Chicago society, in February, tells of the new method of cutting away the proximal aspects of the molars and bicuspids that are affected by caries, and replacing with large metallic surfaces properly shaped to control the proximal space, and thus offering a roost for the microbes that they cannot destroy with their acids. I quite agree with the doctor in the main, on the counts he has made. In the case of considerable destruction of the enamel and dentine at this point, but I feel that there is a class of cavities that can be treated in a less heroic manner with good results. The moderate and small-sized cavities around which the enamel is not affected would be of this type. Take two moderate sized proximal cavities as an example in teeth of normal

shape and position. At first examination if time permits place between these teeth a pellet of cotton saturated with chloro-percha. This is repeated at intervals of three or four days, increasing the size of the pellet until the space is sufficiently large to permit of *thorough* preparation of cavities and of filling and finishing the fillings, and when the teeth resume their natural position the oval surfaces of the fillings should come in contact, and at no point should the enamel on either tooth touch the opposing filling or tooth. The point of contact should be as near the occlusal surface as consistent with the case. Treated in this manner, the margins of the enamel are as self-cleansing as under the best conditions that nature provides and gives the gums in the proximal space good protection. Dr. Miller and Dr. Black have for some time maintained that the fluids of the mouth were responsible for carious teeth, only as they aided or opposed the growth of organism. Dr. Williams has demonstrated this to be the fact, and accounts in this way for predisposition to decay, whether the teeth are what are known as hard or soft teeth. In cases of marked predisposition it is probably necessary to apply the method Dr. Black advocates. With incisive teeth we see many cases of recurrence of decay at the cervical and at the incisive margin of cavities, that were well prepared and carefully filled, but when they resumed their natural position the point of contact was at either of the margins of the enamel rather than the filling. This result probably was due to not having sufficient space by separating to contour the filling sufficiently to allow of their being finished, and still have the contour project beyond the margins and act as a buffer to hold the enamel apart, so that they may be cleansed and cleanse themselves to a degree.

I wish to appeal from the decision and practice, of some good men in the profession that the use of the matrix, is in opposition to these results unless an extreme amount of separation has been procured, while the making and the placing of the filling is a little easier. The completed filling does not often meet the requirement of the restoration of the original tooth.

In crown work where the space is contracted, there is a liability to having straight surfaces in contact, that it is desirable to avoid. Separating will often correct this condition so that cleansing spaces will remain and the gum septum be restored.

In conclusion I wish to appeal to the dental profession to be

more thorough in separating teeth to be filled, no matter what filling material is to be used. Make the point of contact of a shape that would best protect the proximal space from the encroachment of food. Have the fillings rest against each other holding the enamel apart from touching adjoining tooth or fillings. This metallic point of contact acts as a protection to the tooth from re-decay as a sled runner is protected from wear by the iron shoe fastened upon it.

#### DISCUSSION.

DR. SWEETNAM: Dr. Morse has certainly struck the idea of most practical importance of anything that should engage the attention of dentists at the present time. Where the doctor has placed the most importance is at the point of contact. Let us keep in mind the inter-approximate space. I don't care what the shape of the filling is if that space is preserved. Dr. Black has become a crank on that idea. He brought it out in 1890. In 1892, Dr. Ottolengui, of New York, brought up similar ideas. Dr. Williams, of England, goes on and explains how caries will come in and attack that surface. In regard to securing that space, we have a great many different methods of separating the teeth. There are cases where slow process is necessary. Where decay has been so slow that one tooth has dropped into the cavity of the other, and the inter-proximate space has entirely disappeared. In that case it is necessary to wedge by slow means to recover the lost space. I think it is the only circumstance in which a man is at all excusable for using wedges of any kind. There are many accidents from wedges, where they are driven down and destroy the gum septum we want. Take the bar separator. You can separate the teeth with little or no pain. You don't need a great deal of space, but enough to make a sufficient contour to that filling to preserve the inter proximate space. The same rule applies to crown work. The point of contact is not of so much consequence so long as the inter-proximate space is preserved. If that isn't regarded, that filling will invariably come out.

I don't care if fillings were put in yesterday and that has been disregarded, I would take them out at once, and that patient would be made comfortable. It is unnecessary to wait for decay. I would leave a sufficiently strong wall, where, if they let them

decay, they get farther than I want them to go. I think a man is justified in removing fillings of that kind. I use the double bar separator. It is necessary to note the space and when those teeth come together, to see that they strike at the point you expect. It is not always necessary to have the teeth strike where they did, but where we want them to.

DR. MORSE: If the point of contact, as I have tried to designate, is made with a good understanding of it, it will accomplish the rest at the same time. I have a set of separators; I formerly used them altogether, but I find that in treating teeth where I use cotton pellets and gutta percha, in many instances I obtained separation without using the separators. I now make a practice of doing so all the time, and find that by making gradual application it is not necessary to make the teeth sore, and by getting sufficient space, when ready to operate, I don't need to have any separators in the way. It doesn't require a great while to do it. Ordinarily a week's time is sufficient.

DR. HOFF: The matter of restoring the contour of teeth and retaining the inter-proximate space is an old one suggested years ago. As long ago as when I came into the profession this was an important subject. Dr. Black seems to be enjoying the reputation of having discovered what was known and talked about as long ago as when cohesive gold fillings were first used. We are greatly indebted to Dr. Black, in behalf of the younger members of the profession, for the scientific way he has stated this important principle. I have always made my fillings on the contour plan. Have never had any sympathy with the practice of separating the teeth. I think if there is anything that is abominable, it is that. I have always avoided making fillings of that character. I have always made an effort to have as little contact as possible with the fillings. In the beginning I had no other idea of the value of this matter than the esthetic. The knowledge that we now have of bacteriological influence was not known. We said the acid, where left to hang on the side of the teeth by capillary attraction, dissolved the tooth at the joint and it decayed along the border. I was early instructed in the importance of making the borders of the cavities of these fillings secure. I think in these cavities we are inclined to try to preserve too much of the tooth tissue at the cervical border, because of the difficulty in making a perfect seat and joint, and it is difficult to keep dry..

I think more fillings fail near this cervical margin than elsewhere. Fillings seldom fail on the lateral border unless from bungling work. The difficulty is not because we fail to get a firm anchorage or finished joint, but we expose a margin peculiarly susceptible to the agents of decay in the mouth. The necessity of making a true border and tight joint is equally important with making the point of contact and preserving the inter-proximate space. I agree heartily with the idea of making contour fillings and maintaining the inter-proximate space. Nothing is more disagreeable than two flat surfaces of teeth together. When we have chicken for dinner, we have to devote the rest of the afternoon to removing the shreds.

DR. SWEETNAM: Dr. Hoff speaks as though this subject of the inter-proximate space was an old one; but it is not, I have been since 1879 a student and knew nothing about the inter-proximate space before Dr. Black came out in 1890, excepting from my own experience. If anyone has written anything on the idea of the retention of the inter-proximate space before 1890, I would like to know of it. I also disagree with him in regard to fillings failing mostly at the cervical margin. It is at the *lingual* margin.

DR. YOUNG: I think I can correct Dr. Sweetnam in his statement that there has been nothing published previous to 1890. Marshall Webb's Notes on Operative Dentistry carry out this idea right through.

DR. LOWRY, of Kansas City: The idea of contour approximate fillings antedates the idea of giving teeth that saw-tooth form, separating every tooth, making every tooth smaller at the cutting edge than at any other portion. That was a fad and lasted only a short time. The idea of contour approximate fillings is a self-evident fact. We know that if you give fillings a tooth contact instead of a metal contact, that decay will recur. You have got to have your margins so formed and situated that excursions of food will keep them clean. With reference to the cervical border, I find it is the easiest point to preserve. I will tell you my reason. In the first place you have more direct action upon it with your instruments. You can spread your gold more thoroughly at that point. The failure of fillings at the cervical border is largely due to defective excavation and defective finishing. I give my gold fillings a gold contact. I bring my gold

just beyond the point where there would be danger from the tooth substance coming in contact. You can do that in a great majority of cases without any separation at all. Separating is seldom necessary where teeth are partly decayed. In that case you can do pretty well if you have an artistic eye and mind. But give your approximate fillings as nearly as possible a point of contact at the cutting edge, and you won't make a space that will attract food. With a matrix, I claim it is an absolute impossibility to produce a perfectly moisture proof tooth margin. Never with a gold filling. It is an invention to save trouble, but not to save teeth. I have never seen a good gold filling put in with a matrix.

DR. FIELD: I understood the last speaker to say he considered the cervical margin to be the most invulnerable to decay. I consider it the most vulnerable of all positions. I also understood him to say he had never used a matrix. Well, if I should say I had never used one, then I should not get up on this floor and discuss the matter, because I would think there was a chance to learn something. I think a matrix is sometimes invaluable.

DR. PARKER: I think the idea of contour fillings and preserving the inter-proximate space was fully talked over as early as 1855 or 1856. I think the dental reports will show it. I agree with Dr. Field that the cervical borders are the most difficult to handle.

DR. RIX: I wish to take issue with the paper and also with the gentleman who opened the discussion on the paper in regard to the advocacy of contour fillings being of late date. I well remember when cohesive foil first came into notice that some very able dentists advocated contour filling so as to preserve the interproximate space, and if I am not mistaken Dr. Watling demonstrated that method before this association.

DR. WATLING: I think I did something of that kind.

DR. SWEETNAM: Dr. Rix has been asleep. I never said anything about contour fillings.

DR. LOEFFLER: I listened to the paper very carefully; was very much pleased with it, but it seems to me we cannot be talking about two or three things at the same time. If I understood the doctor right, his paper was about where decay started at the point of contact. We cannot assume that decay does not start elsewhere. We must stick to the point of contact or have another paper.

## The Emerson System of Physical Culture for Dentists.\*

BY MISS ANNIE GRACE DAVIS, WARREN, PA.

(Continued from page 367.)

"THERE are three ways of walking with reference to the hips.

1st. An easy movement which allows a slight play of the hips while the chest keeps its position reposefully. There is a tradition concerning Buddha which tells us that when he was walking, unless one could see his person below the waist line, he seemed to be sailing in a boat on a smooth river. We do not claim this exercise will produce the ideal walk but it develops the first conditions a *strong chest* and free hips.

2d. People swing the body with the hips.

3d. When the hips are held stiffly.

The next exercise is for freeing and strengthening the sides which gives great exercise to the stomach by causing it to fall and rise as it does during the respiration of very powerful men and women.

Place thick of hand upon the floating ribs, merely as a guide to the mind, not to assist the muscular effort; draw the sides as near together as possible, as in Fig. 7, then send them as far apart as possible, as in Fig. 8. Repeat this movement, then allow the arms to fall at sides. During this exercise a perfectly upright position is to be maintained; the body is not to bend in the slightest degree.

It carries this motion to a much greater extent however and is a very vigorous exercise for the most powerful muscles of respiration. It develops greater breathing capacity and gives more freedom to the organs.

I have known five minutes' application of it to cure an ACUTE attack of indigestion.

*Developing Gamut of Chest Perpendicularly.*—Take a good standing position, place the fingers lightly in region of third rib, (as in Fig. 9), lower the chest at this point as much as possible by an effort of the will, allowing every other part of the body to accommodate itself to this attitude. Now lift the chest directly up toward the chin. As a consequence the shoulders come back to place, the spine becomes erect, the crown of the head rises to

its utmost height. Repeat this exercise and then take normal position.

This deepens the capacity of the chest, furnishing more room for the lungs, gives powerful exercise to all the muscles that con-



FIGURE 7.

trol the ribs and strengthens the muscles that hold the internal organs in their proper places. This exercise attracts attention to the thorax only by the placing of the hands; but its reach is such as to cause all the muscles of the trunk to move in unison. When the lungs are sufficiently high by means of a well elevated

chest, what is termed as thoracic breathing, as distinguished from diaphragmatic breathing, is never practiced, because one cannot get satisfaction. In normal respiration the diaphragm descends during inspiration and ascends during expiration, the abdominal muscles moving consistently with it. This not only causes the lungs to fill, but by the continuous movement of the diaphragm and abdominal muscles the organs below the diaphragm, as well as above, are kept in constant motion, thereby promoting free circulation and aiding digestion. Little children always breathe in this way as do the adults of the *strongest* races.

"In the waist exercise, which comes next, all the contents of the abdomen, but more especially the stomach and liver, are seized between the abdominal muscles and diaphragm and pressed very strongly during all the movements towards the front, and relieved during the back movements."

*Exercise for Waist.*—"Place the thick of hand on top of hips, fingers pointing downward, thumbs forward; continue this position throughout the exercise; bring the thighs a little forward; bend that part of the body forward which is above the ensiform cartilage; do not let thighs or hips move from the first position you give them, but continue bending the body, following the arc of a true circle around to the right side, then to front, then to left side, then front, to right, to left, then to right and around to back, and continue around to front, then lift the body gracefully to position."

"This exercise is in direct obedience to the law of physiology, that alternately contracts and relaxes throughout the human system. It is by this mechanical tension and relaxation that the blood circulates, the peristaltic wave is produced and each part is made stronger and more vigorous. This is the effect produced upon the vital organs by this exercise."

"The physiological cry is for good and abundant material to make into muscle, nerve, bone, brain and every other tissue, and the vital organs must furnish all this. Therefore, instead of aiming all our gymnastic work towards developing mighty muscles, which are a great drain upon the vital organs, the main object of physical culture should be the care of these organs. This does not by any means argue against development of muscle—it argues for its proper use." Gymnasium work for most people has been called more often a straining than a training.

Many people experience much suffering in the back of the head and neck, owing to imperfect circulation in that region, and the articulations there are often partially rigid. This is particularly noticed in advancing age. The consequence is that the head, chest and back interfere with each other's movements. The following exercise gives freedom to these parts and frees the circulation of blood, especially at the base of the skull, exercising 20 pairs of muscles.



FIGURE 8.

*Exercise for Freeing the Neck.*—“Take an erect position. Bring head forward and down until the chin touches the chest, if possible, carry head around to right shoulder, face looking perpendicularly at ceiling. Now twist the head backward on the neck as severely as the strength will permit. Again bring chin

upon right shoulder and keep it close to breast when carrying it around to left shoulder, then throw back of head onto right shoulder, then twist the head backward as before, then bring chin upon left shoulder and carry head to first position on chest, then raise it normally."

In the muscular system the different groups of muscles are so arranged as to assist each other in every effort. "If the muscles that sustain any particular member are called upon to perform any task, usually several other groups automatically volunteer their services to help the leading ones. The muscles of the trunk of the body are, in all normal exercise, called upon to sustain the effort of the upper and lower extremities, so if the arms and legs are exercised in the right manner, there is a reflex action brought to bear upon the muscles of the torso, which increases its vital power."

"Every exercise that an arm or leg takes should involve, in addition to its own muscular development, a definite exercise for some part of the torso." "Two questions, at least, should be asked regarding the correctness of every exercise. 1st. What will it do for the part that leads? 2nd. What will it do for the trunk of the body? The object of all the next three groups of exercises is 1st, to develop the trunk of the body by means of exercising its branches; 2nd, to develop the branches.

*Arm Swing Exercise.*—"The person is supposed to maintain a perfect standing position, as in Fig. 1, during this entire exercise. Take a full breath and hold it in the lungs by means of the superior (or false) vocal cords. While the breath is thus held, turn first the right arm around, lifting it up and carrying it over back, thus revolving it like a wheel upon its axis—the shoulder representing the axis, and the arm the wheel. In each revolution carry the arm back as far as possible. Repeat this movement with the right arm, then exercise the left arm in the same manner, then both arms together.

One breath may be held during the entire exercise; or it is better for all but the strongest to take one breath and hold it, in the manner described, during two revolutions of the right arm, then to exhale and take another breath and hold it while the left arm performs the revolutions, then to let out breath and inhale a third time, holding the breath during the simultaneous revolutions of both arms. If dizziness should ensue, take less breath

and change it oftener ; dizziness as oftener comes, however, from not assuming an elastic manner than from holding the breath too long."



FIGURE 9.

In this exercise,\* besides swinging the arms, the breath is held by means of the vocal cords, and very little benefit is derived from swinging the arm unless the breath is held in this way, which causes the apices of the lungs to fill with air. Consumption, as a rule, commences in the apices of the lungs. The cause of this is that for some time previous to the deposit of tubercles, the air cells are not properly filled during respiration, and therefore are, in a measure, collapsed, which weakens the walls of the cells until they are unable to resist a foreign deposit.

\*The exercises cited in this paper are only a few of the many, some three hundred, we believe, movements that Dr. Emerson's book, "Physical Culture," describes.—ED.

That is not all. When the apices of the lungs do not fill there follows of necessity a lack of oxygen in the blood, and consequently the blood becomes impure and devitalizes the whole system." The nervous system is, to a great extent, dependent upon oxygen for its health and vigor. Digestion and assimilation are retarded for want of a sufficient amount of this natural tonic. A vast number of muscles are exercised and all of them are combined in one effort to strengthen the lungs and through them give vigor to every part of the body.

The bending exercises cause such a continuous stretch of the muscles, from head to feet, as searches out all the muscles that, from lack of proper development, are in any degree feeble.

They develop what is sometimes called "staying power" Perhaps you noticed that while one set of muscles is contracted to its utmost, the opposite set is being stretched to its greatest extent, and no other exercises can do more to equalize the circulation of blood. All the voluntary muscles, except those of the head and face are involved.

The reaching exercises employ all the strength of the person and as the strength increases will be taken with greater force. They draw a line of great exertion through the entire length of arm and opposing leg, and also through the torso between. They prevent curvature of the spine and exercise the stomach with great vigor.

There is no motion so quieting as the motions of the spine. Most of us have spinal columns that more or less resemble ramrods, and it is a surprise and delight to find what can be accomplished with the muscles of the spine and back, if they are free. Of course, this being the seat of a great nervous center, it affects many muscles of the body and the condition of those muscles affect the spine.

When we have reached this stage of the work the forces of the system are in a high state of activity. The heart is beating rapidly and the lungs are working with great speed—the entire arterial system is pulsating in a way to send the blood through the lungs very swiftly. If the exercise is suddenly stopped here the great benefit would be lost, and positive injury might occur from violating the law of rythm in nature. If a violent exercise is begun suddenly the danger is great, and it is equally great if ended suddenly. But while vigorous exercise must be taken, it

is equally necessary that suitable exercising for harmonizing the force thus generated should be practiced also.

If you allow vigorous exercises to become less and less vigorous until the forces of the body are quiet, reaction and prostration follow. An entire change in the exercise is required. A hint of this principle may be found in Homer's writings, where he describes the Greek warriors as entering upon athletic games when the battles with the Trojans were suspended but for a day. By these exercises which are to follow, the nervous system is refreshed and invigorated, which enables it to refresh and invigorate the brain. They, the brain and nerves, constitute the battery for all energy, whether mental or physical.

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**Pathologic Conditions of the Pharynx and Contiguous Structures  
During Early Childhood—Prime Factors in the Etiology  
of Mal-Formed Maxillæ and Irregular Teeth, Etc.\***

BY W. A. MILLS, D.D.S., BALTIMORE, MD.

THE physical functions of the nasal cavities are, *viz.* : They elevate the temperature of the inhaled air, give it moisture and purify it, by arresting all particles of dust and other substances which it may contain. They act as resonance cavities for the voice, and are also the seat of the sense of smell. A professional experience of more than twenty-five years has taught us that any inflammatory lesions, found in children between the ages of four and twelve, which obstruct these natural conditions, are in the majority of cases, the chief agents in the causation of mal-formed jaws and the consequent abnormal alignment of the teeth. We cite the following case in our practice :

A boy, age seven years, was brought to the office to have a tooth filled, which was supposed to cause pain in the right ear and right angle of the inferior maxilla. There was almost complete obstruction of the nasal cavities, face pale, anemic and haggard looking, features contracted or pinched at the angle of the jaws, and beneath the malar processes, giving the characteristic of a mouth-breather.

On examination we found a small cavity in a molar tooth,

\*Abstract of Paper read before the Dental Section, American Medical Association, Philadelphia, June, 1897.

which in a manner, could have caused the pain. This was filled but gave no relief. The tonsils were greatly enlarged, almost meeting at the median line. Deglutition was both difficult and painful. On examining the superior maxillæ we noticed a very perceptible contraction on both sides, anterior to the first permanent molar tooth, with a decided inclination of the roof of the mouth to become elevated. We informed the patient's aunt of the state of affairs, with the assertion, that unless something heroic was done quickly, and by a rhinologist, very serious consequences would be sure to follow.

Six months later the patient returned to the office. A specialist had been consulted and he had removed some adenoid growths and was still reducing the tonsils with the galvano-cautery. We found a bright and rosy-faced boy with normal respiration, and imagine our surprise when upon examination, we found no signs of the former contractions of the jaws or rising of the arch but all outlines were normal.

This particular case demonstrated that either the enlarged and diseased tonsils, or the adenoid vegetations, or both, were the prime factors of the causation not only of the mal-formations of the maxillæ but also the oral respiration. If a correct diagnosis had not been made, and only palliative treatment been given, there is no doubt that a case of V or saddle-shaped arch would have been developed, with irregular teeth as concomitants, especially so, as the patient's parents are full-blooded Germans and have large jaws and large teeth.

The starting point in the majority of these cases has its origin in some slight irritation of the mucous membrane of the throat, especially the tonsils.

We would urge upon the medical and dental practitioners the importance of being ever on the alert to discover the first sight of any inflammatory manifestation in the throat or nasal cavities of children as so many lesions are prone to develop along the lines of the respiratory passages without in themselves showing any very acute symptoms; and if permitted to continue without proper treatment of the disease and mal formation, will, in some cases, defy all remedial agencies.

Dr. M. H. Omyer says: "It is my opinion that an inflammation of the tonsil and surrounding tissue will cause tension of the palato-plaryngeal and palato-glossus muscles; if this be so, they

would naturally pull the lateral portion of the arch downward and inward ; especially is this the case with children when their bones are soft and yielding."

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## A Glance at Some Relations of Dentistry to General Medicine.\*

BY DR. GEORGE F. EAMES, BOSTON, MASS.

THE average dentist not only fails to recognize many indications which call for systemic treatment, but fails to see his need of such recognition. If a new drug is advertised he tries it a few times and immediately writes an article on it. He treats all forms of pyorrhea by scraping the teeth, but if the deposit continues to accumulate, the scraping is repeated. He treats sensitive dentine by the application of obtundants, and never dreams of prophylaxis, or the correction of underlying causes. During a persistent and alarming hemorrhage from the socket of a tooth, the heart is allowed to go on thumping against the chest wall, thereby resisting the local styptic and tending to increase the hemorrhage. It is still true in too many cases that a tooth is extracted because a patient asks that it be done. The dental college, with its required three years course, and Latin entrance examinations, still continues to let loose thousands of graduates whose spelling, and use of ordinary English, is excruciating, and whose understanding of the principles of pathology and medicine is practically nil. These go out to practice upon humanity.

It has been said that the dentist's work is largely mechanical ; many make it only mechanical and see only the mechanical side of it. The operator may be engaged in plugging a large distal cavity with gold, but this mechanical operation cannot be disconnected from the fact that in some cases of nervous susceptibility, the entire organism may sympathize with the local irritation to the extent of shock, or nervous collapse. What is the position of the mechanical operator in such a case ? In his failure to recognize the vital connection of the teeth with the human organism he has failed to discharge his whole duty to his patient, and is guilty of criminal neglect.

\*Abstract of Paper read before the Dental Section, American Medical Association, Philadelphia, June, 1897.

A dentist may be called upon at any time to exercise his medical knowledge immediately in cases of nervous spasm, hysteria, syncops, shock, collapse, foreign bodies swallowed, poisoning, hemorrhage, etc., or in a more leisurely way in the consideration of questions relating to stomatitis, adenoid vegetations, malignant growths, operations during pregnancy, and the various inflammatory conditions of the dental pulp and pericementum.

Teeth are being lost at an alarming rate on account of the ravages of the so called pyorrhea alveolaris, and this fact alone, calls for deep medical research, for a thorough physical examination, including the blood, the salivary and renal secretions, followed by appropriate medical treatment. In order to do this a most thorough study of the theory and practice of medicine is absolutely required. I can see no other way to meet these pathological conditions in the mouth, believing as I do, that they are the expression of some diathesis or other general disturbance. As medical specialists we are facing the serious problem of saving thousands of teeth which at the present time are being lost in spite of the great advance which our profession has made, and it rests with us as members of the representative medical body of the United States, to use every means in our power to secure the requirement of a broader general and medical education as one of the essential conditions of graduation.

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### Annual Address.\*

BY PRESIDENT JAMES TRUMAN, D.D.S., PHILADELPHIA, PA.

THE annual gathering of a body such as this, constitutes an era in dentistry and should mean an advance along all lines of work. If this fails to be realized the year has been valueless—a period lost in the progress of the race.

The present meeting is one of great importance ; if the feeling be judged aright, we have reached the “parting of the ways,” and the rising sun of another day already appears above the horizon illuminating the century with a golden halo, indicating brilliant but, as yet, unfathomable possibilities.

The work of the past year will compare favorably with that

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\*Abstract of address read before American Dental Association, August, 1897.

of those preceding it, although the spirit of activity is not abroad in the land. Our calling tends to physical depression and disinclination to that higher work so necessary for advancement. The physical slavery which practice entails is not conducive to active mental effort. The man of investigating mind becomes eventually, not a practitioner, but a laboratory devotee. Hence there has arisen a small class who are the prophets of the age, and these are they to whom we have learned to look for the new ideas which mark progress.

The practical side of dentistry has not exhibited any features during the year worthy of special comment. The literature of this portion of our work has, however, been greatly enriched by several notable productions. While there has been little absolutely new, there has been marked improvement upon older methods of work.

Cataphoresis is gradually finding its true level; its adoption has been phenomenal, and this constitutes its greatest danger, for the unwise rush in and attempt the impossible, forgetting that pain is the sentinel upon the advanced picket line, and our ever-present warning of danger. The use of this method to the best good of the patient means a high order of anatomical knowledge, as far as the teeth are concerned, and this needs to be more and more impressed upon the dental mind.

The work on the scientific side of dentistry has received fresh impulse through the labors of Black, Andrews and Williams. The most brilliant exponent of this class of workers, Dr. W. D. Miller, is physically suffering from the great and exhaustive labors to which he has subjected himself. All here assembled will send back to him the expressed desire that he may know a full restoration to health and activity.

The near approach to the close of the nineteenth century naturally causes a retrospection. What have we stored up in the past one hundred years?

The first real step in advance dates back a little further than the century, to the introduction of porcelain teeth, by Chemaut of France. Then came pulp devitalization by arsenic; pulp canal filling; the discovery of anesthesia; the introduction of cohesive gold; the adoption of the mallet; the various forms of dental engines; the rubber dam, and finally the use of electricity as a motive power and as an obtundent. These are the most promi-

nent and marked stages, each aiding to carry us forward to our present.

The crowning glory of the century, next to that of the discovery of anesthesia, has been the solution of the problem of the ages—caries of the teeth.

The progress in dental education is unexampled in professional educational work ; it has not only reached an equality with that of general medicine, but, in some respects, has led that venerable mother into paths she had not thought of treading.

To the National Association of Dental Faculties we owe all of the advances made in dental education in the United States, and we may look forward with truthful confidence that its work in the future will maintain the high record it has earned in the past.

The natural and final result of advanced thinking and acting is law—in a professional sense, the embodiment of orderly rules of conduct ; hence the dental laws in every State, and the National Association of Dental Examiners.

Antagonism has been engendered by the unwise multiplication of statutes, and as the laws at present stand they are a dangerous obstacle in the path of professional progress and promise to be the one blot upon the otherwise fair fame of the century in dental work.

The aim should be for a unity of effort with the least friction of State with State, with a positive recognition that the decree of one State should, in this matter, be a law for every citizen of the United States. The Constitution of the United States expressly declares (Art. iv., Sec. 2.): "The citizens of each State shall be entitled to all privileges and immunities of citizens in the several States." It is, therefore clear, that a law passed, depriving a citizen who has been declared legally entitled to practice in any State, from the privileges of registration in another State, is unconstitutional, and it is difficult to understand how the Supreme Court of the United States could decide otherwise if a case should be carried before it for adjudication.

In many of the States the members of the Board owe their places to political preference. This association should use its powerful influence to have all places on the boards filled upon the recommendation of State Dental Societies or by bodies having similar powers. . . . In regard to the contemplated reorganization of the dental associations Dr. Truman said :

Reorganization to be effective must be based upon an entire change of methods. Without attempting a solution of this matter it may serve a purpose to point out what may be regarded as some things worthy of change in the old associations.

Dr. Truman then considered the relation of local societies to the national body, a national body being a necessary part of the organization of a profession. Local societies must be established upon a positive standard of entrance, delegates from these societies becoming if they so desire, permanent members of the national organization and part of the controlling body. It will be difficult to change present methods in local bodies, but proper legislation in the national organization would, in time, effect much. The methods of work by sections has been an improvement over older systems. The system is intrinsically weak and can never effect any permanent good results. The establishment of permanent membership has been the deadly poison that has eaten out the life of the American Dental Association. It is an aristocracy band—not a prize for myth's work but upon *ability to pay* the yearly fee and attendance at the annual meetings. Is it not time to originate a body distinct from all others, and which should embrace elements of strength rather than weakness? A national body should be the culmination of all below it. It should embrace the concentrated wisdom of all subordinate societies. The affiliating organizations should send to the national only such members as have given the profession satisfactory work. With this care in the selection of members, the national body would partake of the character of the higher scientific bodies of older civilization.

The regular practitioner of dentistry cannot work for the advance of his profession if it interferes with his daily work. The true investigator of problems finds practice irksome and is ready to burst the bonds which environ him for the more enjoyable fields of the mysterious unknown.

The time seems to have arrived when means should be found to set free these imprisoned students and make it possible for them to work independently of the cares of life.

When the new organization is perfected it is hoped the possibilities in this direction may be considered and a fund established looking to financial aid to those who are continually sacrificing themselves that the profession may make progress worthy of its high aspirations.

**Union of the American and the Southern Dental Associations.**

Organization of the National Dental Association.

The American Dental Association adjourns *sine die*.

The Southern Dental Association Re-Organizes as The Southern Branch of the National Dental Association, to be Known as The Southern Dental Association.

HYGEIA HOTEL,  
OLD POINT COMFORT, VIRGINIA, }  
August, 1897. }

[Reported for THE OHIO DENTAL JOURNAL by Mrs. J. M. Walker.]

THE Southern Dental Association was called to order for its twenty-eighth annual meeting, at 11 a. m., Tuesday, Aug. 3, 1897. The president, Dr. William H. Richards, of Knoxville, Tenn., in the chair. The American Dental Association met at the Chamberlain Hotel at the same hour, the president, Dr. James Truman, Philadelphia, in the chair. Mutual courtesies of invitation, etc., were tendered and formally adopted.

In both associations the report of their respective Committee on Union was made the special order of business for Wednesday afternoon session, at which time Dr. L. G. Noel, chairman of the committee from the Southern Dental Association, read the following report:

Your committee has considered the subject of Union of the Southern Dental Association and the American Dental Association, and beg leave to make the following report:

The Union of the two associations seems to them a desirable object to be attained, and they, in conference with the committee from the other association, have devised a plan, making the following provisions:

*First:* A new name.

*Second:* Assuring the membership in the new association of all the members of the Southern Dental Association and the American Dental Association.

*Third:* Providing for the organization of branches in the several divisions of the country, one of which shall be a continuation of the Southern Dental Association in the South, thus preserving to us, in its entirety, this organization which has become

so dear to our hearts during all the years of its struggles and success. Its history and autonomy will be thus preserved.

*Fourth:* The plan contemplates dividing the country into three parts (or divisions) and holding the annual meetings by rotation in the several divisions; thus, in 1898 the meeting will be held in the West, in 1899 in the East.

*Fifth:* The plan we would suggest also provides for the selection of officers in like manner, by rotation from the several divisions of the country.

Your committee would respectfully suggest that an early time be fixed for holding a general conference of the members of the two associations, with a view to perfecting a plan of union.

(Signed) L. G. NOEL,  
E. P. BEADLES,  
GEO. EUBANK,  
J. ROLLO KNAPP,  
V. E. TURNER.

Printed copies of a proposed constitution for the new organization had been mailed to all the members of the two associations previous to the meetings but numerous alterations and amendments having been subsequently made by the joint committee, Dr. Noel proceeded to read the proposed preamble, constitution, rules of order, order of business and standing resolutions as amended up to the hour of reading.

At the conclusion of the reading Dr. J. Rollo Knapp, New Orleans, offered a motion to the effect: "It is the sense of this society that the report of this committee be accepted, and that the union be effected."

On motion, Dr. Fillebrown, Boston, chairman of the committee of the American Association, spoke at some length on the many advantages offered by the proposed consolidation of the two associations.

After some discussion Dr. Knapp's motion was put to vote and passed by a decided majority.

On motion of Dr. Cowardin, of Richmond, the same committee was continued to confer with the other committee and fix upon a time for a joint meeting of both associations for the purpose of effecting the union. Similar action was taken in the American Association and a joint session of the two associations was accordingly held in the spacious ball-room of the Hygeia Hotel, at 12.30, on Thursday, Aug. 5.

The meeting was called to order by Dr. Thomas Fillebrown, of Boston, chairman of the joint committee on consolidation.

On motion, a temporary organization was effected by the election of Dr. John B. Rich, of Washington, D. C., one of the oldest practicing dentists in the United States, as temporary chairman. Dr. W. E. Walker, of Pass Christian, Miss., was elected secretary *pro tem.*

Dr. George H. Cushing, of Chicago, was selected corresponding secretary *pro tem.*

Dr. Patterson offered the following resolution, which was adopted without discussion :

*Resolved*, That the members of the American Dental Association and the members of the Southern Dental Association do hereby organize themselves into a body, to be known and styled as "The National Dental Association."

Dr. John S. Marshall offered the following :

*Resolved*, That the constitution, by-laws and rules of order decided upon and presented by the joint committee of the two bodies be and are hereby adopted as the constitution, by-laws and rules of order of "The National Dental Association." Adopted.

A motion was offered by Dr. Taft that the secretary read the constitution, by-laws and rules of order, in order that the members may better understand it.

The motion was carried, and the secretary read the constitution, rules of order, standing resolutions, etc., as adopted.

The next business before the meeting being the election of permanent officers Drs. Taft and Nobles were appointed tellers and an informal ballot taken.

Drs. J. B. Rich, James McManus, W. W. H. Thackston, Truman, Brophy, Taft, Peirce, Beach, Crouse, B. Holly Smith and H. A. Smith received complimentary votes, Dr. Thomas Fillebrown, Boston, receiving nearly two-thirds of all the votes cast. On motion of Dr. J. Hall Moore, the informal ballot was made formal, and on motion of Dr. Beach, the rules were suspended and the secretary cast the unanimous vote of the National Dental Association for Dr. Thomas Fillebrown as its first president. (Great applause.) The temporary chairman then appointed Dr. James Truman, of Philadelphia, and Dr. W. H. Richards, of Knoxville, Tenn., presidents respectively of the American and Southern Associations to escort the president, Dr. Fillebrown, to the chair.

These gentlemen presented the new president to the convention.

Dr. Fillebrown accepted the honor bestowed upon him in a graceful speech. He said that he had witnessed to-day what he had desired and labored for over twenty years, the organization of a broad national association, and he could say, like the prophet of old, "Now, Lord, let Thy servant depart in peace, for mine eyes have seen Thy consolation." He was heartily applauded.

On motion of Dr. Beach, of Virginia, the convention then adjourned to 4.30 o'clock p. m.

#### AFTERNOON SESSION.

On motion of Dr. Crawford, by unanimous consent, the office of assistant secretary was created, and made a matter of record.

Dr. Geo. H. Cushing, of Chicago, was elected secretary, and on motion of Dr. C. N. Peirce, he was authorized to cast the ballot for Dr. W. E. Walker, of Pass Christian, as his assistant secretary.

The following officers were then elected :

Vice-President from the Eastern division, Dr. Jas. McManus, of Hartford, Conn.

Vice-President from the Western division, Dr. L. L. Dunbar, of San Francisco, Cal.

Vice-President from the Southern division, Dr. B. Holly Smith, of Baltimore.

Corresponding Secretary, Mrs. Emma Eames Chase, of St. Louis.

Treasurer, Dr. Henry W. Morgan, of Nashville, Tenn.

Executive Committee.—The chair announced that the executive committee was composed of nine members, three of whom are elected at their first election for three years, three for two years and three for one year, and that one of each three must be selected from each division. Before the convention proceeded to an election, Dr. E. P. Beadles offered the following :

*Resolved*, That the president cast the ballot for the executive committee for members of the association best suited for the position.

The resolution was adopted.

The president subsequently announced the following as the names of the committee :

To serve three years—Dr. J. L. Noel, Dr. J. N. Crouse, Dr. V. H. Jackson.

To serve two years—Dr. M. F. Finley, Dr. J. D. Patterson, Dr. H. A. Smith.

To serve one year—Dr. Geo. Eubank, Dr. G. V. I. Brown, Dr. C. N. Peirce.

Dr. John S. Marshall offered a resolution that the treasurers of the American and of the Southern Dental Association furnish the treasurer of the National Dental Association with the names of all the members of the associations in good standing at the time of adjournment, and that he be directed to add their names to the constitution as permanent members and that this act be as legal and binding as if the signatures had been affixed by the individuals themselves.

The motion was adopted.

Omaha, Minneapolis and Denver were put in nomination as the next place of meeting of the convention. A ballot was taken and Omaha receiving the majority of the votes cast was announced as the next place of meeting of the association.

On motion of Dr. John S. Marshall, the president was requested to appoint a committee of three to take under consideration the establishment of a journal for publishing the annual proceedings of the convention, with other original matter pertaining to surgery and the collateral sciences, and to report at the next meeting.

The following offered by Dr. Crawford was adopted :

*Resolved*, That it is the sense of the National Dental Association that any member of the dental profession in good standing presenting a certificate of registration from any State in the Union, that the same should be admitted to registration in any other State of the Union, when presenting such certificates of registration and good standing professionally, without an additional examination.

On motion, the president was instructed to have a sufficient number of corrected copies of the constitution and by-laws printed for the use of the members of the association.

To meet this and other expenses of the National Association, which has an empty treasury, the dues of present members having been paid to the American and the Southern Associations respectively, the treasurers of the two associations were authorized to

turn over to the treasurer of the National Association one dollar for each member in good standing.

On motion of Dr. R. Finley Hunt, the president was authorized to appoint a committee looking to the preparation of a history of the dental profession in the United States.

Dr. Crouse offered a resolution to the effect that any member of the dental profession who has been a reputable practitioner for fifty years may be elected a permanent member of the National Dental Association without payment of dues.

This was unanimously adopted.

On motion of Dr. M. F. Finley, a motion in the interests of public health was adopted looking to the employment by the army medical museum and library of a dentist to be selected for his eminent ability and fitness, whose time shall be wholly devoted to the advancement of dental science.

On motion, a committee of three—Drs. Taft, Crawford and McManus—was appointed to confer with state and local societies to aid in the formation of new societies, etc.

On motion, it was resolved, that the proceedings of the present meeting of the National Dental Association be attached as supplementary to the proceedings of both the American and the Southern Dental Associations and incorporated in their published reports.

On motion of Dr. Richards, the two associations were requested to deposit their gavels in the Army Medical Museum at Washington.

A motion by Dr. J. Y. Crawford, that the name of the new organization be changed to that of "The American Association of Dental Surgeons," caused an animated debate and brought out the suggestion of other names—Association of Stomatologists; Association for the advancement of Dental Science, etc., etc. There being objections made to all the proposed changes they were laid over for consideration at the next annual meeting, and the association adjourned to meet at Omaha in 1898.

**National Association of Dental Faculties.**

THE fourteenth annual meeting of the National Association of Dental Faculties was held at the Hygeia Hotel, Old Point Comfort, Va., commencing Friday, July 30, 1897.

The following members of the association were represented as noted below:

*Alabama Dental College*, Birmingham, Ala.—T. M. Allen.

*University of California, Dental Department*, San Francisco, Cal.—L. L. Dunbar.

*Columbian University, Dental Department*, Washington, D. C.—J. Hall Lewis.

*Howard University, Dental Department*, Washington, D. C.—A. J. Brown.

*National University, Dental Department*, Washington, D. C.—J. Roland Walton.

*Atlanta Dental College*, Atlanta, Ga.—William Crenshaw.

*Dental Department of Southern Medical College*, Atlanta, Ga.—S. W. Foster.

*Chicago College of Dental Surgery*, Chicago, Ill.—T. W. Brophy, Louis Ottofy.

*Northwestern University Dental School*, Chicago, Ill.—Theo. Menges.

*State University of Iowa, Dental Department*, [Iowa City, Iowa.—W. S. Hosford.

*Louisville College of Dentistry*, Louisville, Ky.—H. B. Tileston.

*Baltimore College of Dental Surgery*, Baltimore, Md.—M. W. Foster.

*University of Maryland, Dental Department*, Baltimore, Md.—F. J. S. Gorgas.

*Boston Dental College*, Boston, Mass.—J. A. Follett.

*Harvard University, Dental Department*—Thos. Fillebrown.

*Dental College of the University of Michigan*, Ann Arbor, Mich.—J. Taft.

*University of Minnesota, Dental Department*, Minneapolis, Minn.—W. P. Dickinson.

*Kansas City Dental College*, Kansas City, Mo.—J. D. Patterson.

*Western Dental College*, Kansas City, Mo.—D. J. McMillen.  
*Marion-Sims College of Medicine, Dental Department*, St. Louis, Mo.—J. H. Kennerly.

*Missouri Dental College*, St. Louis, Mo.—A. H. Fuller.

*University of Buffalo, Dental Department*, Buffalo, N. Y.—W. C. Barrett.

*New York College of Dentistry*, New York City.—F. D. Weisse, J. Bond Littig.

*Cincinnati College of Dental Surgery*, Cincinnati, Ohio.—G. S. Junkermann.

*Ohio College of Dental Surgery*, Cincinnati, Ohio.—H. A. Smith.

*Western Reserve University, Dental Department*, Cleveland, Ohio—George H. Wilson.

*Pennsylvania College of Dental Surgery*, Philadelphia, Pa.—C. N. Peirce.

*Philadelphia Dental College*, Philadelphia, Pa.—S. H. Guilford, Leo Greenbaum.

*University of Pennsylvania, Dental Department*, Philadelphia, Pa.—James Truman.

*Tennessee Medical College, Dental Department*, Knoxville, Tenn.—R. N. Kesterson.

*Central Tennessee College, Meharry Medical Department School of Dentistry*, Nashville, Tenn.—G. W. Hubbard.

*University of Tennessee, Dental Department*, Nashville, Tenn.—J. P. Gray, L. G. Noel.

*Vanderbilt University, Dental Department*, Nashville, Tenn.—H. W. Morgan.

*University College of Medicine, Dental Department*, Richmond, Va.—L. M. Cowardin.

*Royal College of Dental Surgeons*, Toronto, Canada—W. E. Willmott.

The following schools were elected to membership:

*Milwaukee Medical College, Dental Department*, Milwaukee, Wis., represented by Reinhold E. Maercklein.

*Tacoma Dental College*, Tacoma, Wash., the constitution being signed by proxy by Dr. Kennerly.

*New York Dental School*, New York City, represented by John I. Hart.

*Ohio Medical University, Dental Department*, Columbus, Ohio, represented by J. F. Baldwin.

*Baltimore Medical College, Dental Department, Baltimore, Md.*, represented by J. W. Smith and William A. Montell.

The application for membership of the University of Omaha, Dental Department, was laid over till next year, at the request of its officers.

Applications for membership were reported by the Executive Committee from the Pittsburg Dental College, Pittsburg, Pa.; Dental Department of the College of Physicians and Surgeons, San Francisco, Cal.; Colorado School of Dentistry, Denver, Col.

The following report laid over from last year was adopted:

"Your committee on choosing a color respectfully report that they have decided to recommend the standard lilac as the distinctive dental color, and they recommend the adoption of the academic costume according to the requirements observed by the intercollegiate system."

The resolutions laid over from last year, making the annual college term seven full months, and recommending that the annual meetings be held in connection with the National School of Dental Technics, and at a time of the year when the colleges are in session, were negatived.

A committee, consisting of Drs. Henry W. Morgan, M. W. Foster, Theo. Menges, C. N. Peirce, and H. A. Smith, was appointed to meet a similar committee from the National Association of Dental Examiners, for the purpose of harmonizing the differences of opinion between the two associations. This committee reported rules which had been agreed upon by the two committees.

The report was discussed at length and again referred to the committee, which later reported, through the Executive Committee, a resolution, which was adopted, providing for the codifying and arranging of the existing rules of the association, and the preparation of such additional rules as may be deemed advantageous to both organizations in advancing the standard of dental education in the United States. On motion, the committee which had had the matter in charge in the conference was continued for this purpose.

A communication from the Dental Department of the State University of Iowa was received, asking consent of the association to its conferring the honorary degree on Dr. F. P. Weber, of Cherokee, Iowa. The request was declined on the ground that it is contrary to the practice of the association.

A similar communication from the University College of Medicine, Dental Department, Richmond, Va., asking the privilege of conferring the *ad cundem* degree on Dr. Thomas G. Cowardin, of London, Eng., was refused upon the same grounds.

The rule regarding preliminary qualifications adopted in 1896 was declared to have been adopted in an unconstitutional manner, and was therefore rescinded. The following was adopted in its place, and by unanimous consent was ordered to go into effect at once:

*Resolved*, That the minimum preliminary education requirement of a college of this association shall be a certificate of entrance to the first year of a high school or—in states that have no high school—of graduation from a grammar school, or its equivalent, to be determined by an examination.

*Resolved*, That nothing in the above shall be construed to interfere with colleges of this association that are able to maintain a higher standard of preliminary education.

A communication was read from Dr. W. Mitchell, president of the American Dental Club of London, requesting the appointment of a committee to co-operate with a similar committee in Europe for the purpose of securing just recognition of the diplomas issued by the colleges belonging to the association. The communication was favorably considered, and the president appointed as the committee Drs. W. C. Barrett, D. J. McMillen, S. H. Guilford, A. H. Fuller, and Faneuil D. Weisse.

The Ad Interim Committee reported that one new question decided by them during the year was that a student who was in arrears for fees could not be accepted by another college if objection was made by the college to which he was indebted. This ruling was sustained by vote of the association.

The committee also recommended that steps be taken to secure definite knowledge as to the curricula and requirements of foreign colleges, so that the members of the association should be able to decide upon the standing of students coming from them. Referred to the committee appointed to consider the matter of Dr. Mitchell's letter.

A paper prepared by Dr. W. C. Barrett, Buffalo, N. Y., at the request of the Executive Committee, and entitled "The Study of Anatomy," was read by its author.

The paper was, on motion, directed to be incorporated in the official report and copies sent to the journals for publication.

A committee, consisting of Drs. S. H. Guilford, Theo. Menges, and M. W. Foster, was appointed to select persons to prepare papers on subjects connected with the work of the association, to be read before the next meeting.

Dr. Barrett offered the following, which was adopted :

*Resolved*, That the final vote upon the admission of a college to this association shall not hereafter be taken unless a duly certified and qualified delegate is in attendance.

The following resolution, offered by Dr. L. L. Dunbar, was adopted :

*Resolved*, That in order to maintain a reputable standing in this association no college under its jurisdiction shall permit any member of its faculty or teaching staff, board of trustees, or stockholders to serve in a judicial capacity as a member of a state board of examiners.

Dr. Taft offered the following, which was adopted :

*Resolved*, That a committee of three on curriculum be appointed, whose duty it shall be to compare the schemes of study of the various dental colleges, with the view of harmonizing these schemes and making them as nearly alike as practicable, to report next year.

The Committee on Text-Books recommended the following : Essig's "American Text-Book of Prosthetic Dentistry."

Hodgen's "Dental Metallurgy."

Schafer's "Essentials of Histology," fourth edition.

Abbott's "Principles of Bacteriology," third edition.

Gray's "Anatomy," last edition.

Luff's "Manual of Chemistry."

Burchard's "Compend of Dental Pathology and Therapeutics."

The report was adopted, and the committee was instructed to examine Kirk's "American Text-Book of Operative Dentistry," and Marshall's "Injuries and Surgical Diseases of the Face, Mouth, and Jaws," and forward their views at the earliest possible moment to the secretary, in order that they may be incorporated in the printed Transactions.

A committee, consisting of Drs. M. W. Foster, William Crenshaw, and L. G. Noel, reported appreciative resolutions on the death of Drs. Frank Abbott and Francis Peabody, late members, who have died since the last meeting was held. The resolutions were adopted.

The following lie over for final action till next year :

Offered by Dr. H. W. Morgan, seconded by Dr. H. B. Tileston :

*Resolved*, That on and after the session of 1899-1900, the regular sessions of each college belonging to this association shall be extended to four years.

Dr. J. Taft moved to amend the constitution to require applications for membership to be sent to the secretary of the Executive Committee instead of to the secretary of the association.

Offered by Dr. T. Fillebrown :

*Resolved*, That no college connected with this association shall confer any degree as honorary which is usually granted in due course of study and examination. All former rules on the subject are hereby repealed.

Offered by Dr. Barrett :

*Resolved*, That after the regular session of 1898-9 the annual college term for the members of the association shall be seven full months.

Dr. Crenshaw moved to strike out Rule 3 and adopt the following instead :

*Resolved*, That the time in which students can enter schools of this association shall be the first ten days of the session of the school, dating from the time announced in its catalogue.

The following were elected officers for the ensuing year: T. W. Brophy, Chicago, president; D. J. McMillen, Kansas City, Mo., vice-president; J. H. Kennerly, St. Louis, Mo., secretary; H. W. Morgan, Nashville, Tenn., treasurer. J. Taft, Cincinnati; Thomas Fillebrown, Boston, Mass.; B. Holly Smith, Baltimore, Md., executive committee. James Truman, Philadelphia; F. J. S. Gorgas, Baltimore; J. Hall Lewis, Washington, D. C., ad interim committee.

The newly elected president on being installed, announced the following appointments: J. A. Follett, Boston, Mass.; H. A. Smith, Cincinnati, Ohio; L. L. Dunbar, San Francisco, Cal.; J. D. Patterson, Kansas City, Mo.; W. T. McLean, Cincinnati, Ohio, committee on schools. S. H. Guilford, Philadelphia, Pa.; William Crenshaw, Atlanta, Ga.; W. C. Barrett, Buffalo, N. Y.; W. P. Dickinson, Minneapolis, Minn.; Faneuil D. Weisse, New York City, committee on text-books. J. Taft, Cincinnati, Ohio; Edward C. Kirk, Philadelphia, Pa.; A. H. Fuller, St. Louis, Mo., committee to select subjects and essayists for next meeting.

Adjourned to meet at the call of the Executive Committee.

## BRIEFS.

**A Hard Drill** can be made by heating to a cherry red and cooling in mercury.—*Brit. Journal.*

**Darken Facing with Pumice.**—If the facing is too white rub with fine pumice slowly.—*Dental Review.*

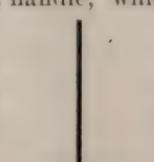
**Caustic Pyrozone for Sterilizing.**—Though it is not absolutely essential, cavities can be thoroughly sterilized previous to the insertion of the filling with caustic pyrozone.—*Dental News.*

**Pumice Mixed with Soap.**—To prevent pumice flying on one's clothes while polishing, mix some soap in water until a foam is produced; then add the pumice to it, and dab the mixture on the denture which is being polished with a soft brush.—*W. H. Wilshire, Ash's Quarterly.*

**Ankylosis.**—The question of ankylosis is determined by the severity of the inflammation, the presence of intra-articular pressure, the subsequent cicatrical contraction of soft parts around the joints, the tissues involved and the amount of destruction of bone and cartilage.

Inflamed joints treated upon the plan of absolute immobilization, and the relief of intra-articular pressure, furnish by far fewer cases of ankylosis, limited motion and deformity.—*Dr. Phelps in Postgraduate.*

**To Remove the Model from the Sand when about to Cast a Zinc.**—There is a hint, which it may be worth while to add, on the method of removing the model from the sand when about to cast a zinc. The common method of driving a sharp point into the model, especially when the model is thin or over-dried, is a troublesome and sometimes risky operation often attended by failure. If, by another method, small portions of the sand are removed, so that the model may be lightly grasped, the zinc comes out with some unwelcome additions, however small.

A better plan than either of these is to let fall a drop of wax upon the center of the back of the model when embedded in the sand, or earlier if a Pearsall flask be used, and to press down upon the wax a heated metal disc—furnished with a handle, which may be a second farthing standing edgewise, so : its center. By this handle the the least risk of its falling applied to the disc suffices for  *Lennox, Ash's Quarterly.*

on the first, and soldered to model can be lifted without back; and a very little heat its attachment to it.—*R. P.*

**New Publications.**

THE AMERICAN TEXT BOOK OF OPERATIVE DENTISTRY. In contributions by eminent authorities. Edited by Edward C. Kirk, D.D.S., Professor of Clinical Dentistry in the University of Pennsylvania: Lea Brothers & Co. Publishers, 1897.

We have only the highest praise for this valuable work. It covers over 700 pages of text, contains 751 illustrations, and the subject matter is strictly up to date. The author says:

"The work is essentially a new departure; old traditions have been subjected to a critical study and rejected when found obsolete, or re-stated when their value was evident. The plan followed is one which it is hoped has resulted in a practical exposition of all that may be fairly included under the title adopted, so arranged and adopted as to meet the requirements of those for whom it was written. Where statements are made they are either those of verified fact or are based upon deductions which may be said to be warranted by existing knowledge."

To give the reader an idea of the contents of the book we quote the titles of the subjects treated:

Microscopic Anatomy of the Human Mouth, By Alton Howard Thompson; The Embryology and Histology of the Dental Tissues, By R. R. Andrews; The Examination of Teeth Preliminary to Operation—Methods, Instruments, Appliances—Recording Results, etc., By Louis Jack; Preliminary Preparation of the Teeth—Removal of Deposits and Cleaning of the Teeth—Wedging—Other Methods of Securing Separations—Exposure of Cervical Margins by Slow Pressure, etc., By Louis Jack; Preliminary Preparation of Cavities—Treatment of Hypersensitive Dentine by Sedatives, Obtundents, Local and General Anesthetics—Sterilization, with a brief Consideration of the Physiological and Therapeutic Action of the Medicaments used, By Louis Jack; Preparation of Cavities—Opening the Cavity—Removing the Decay—Shaping the Cavity—Classification of Cavities, By S. H. Guilford; Exclusion of Moisture—Ejection of the Saliva—Application of the Dam in Simple Cases, and in Special Cases presenting Difficult Complications—Napkins and other Methods for securing Dryness, By Louis Jack; The Selection of Filling Materials with reference to Character of Tooth Structure, Various Oral Conditions and Location, Depth of Cavity and Proximity of the Pulp—Cavity Lining, with its Purposes, By Louis Jack; Treatment of Fillings.

with respect to Contour, and the Relation of Contour to Preservation of the Integrity of Approximal Surfaces, By S. H. Guilford ; The Operation of Filling Cavities with Metallic Foils and their Several Modifications, By E. T. Darby ; Plastic Filling Materials —Their Properties, Uses, and Manipulation, By H. H. Burchard, Combination Fillings, By D. M. Clapp ; Inlays, By W. E. Christenson ; The Conservative Treatment of the Dental Pulp, By Louis Jack ; The Treatment and Filling of Root Canals, By H. H. Burchard ; Dental-Alveolar Abscess, By H. H. Burchard ; Pyorrhea Alveolaris, By C. N. Peirce ; Discolored Teeth and Their Treatment, By E. C. Kirk ; Extraction of Teeth, By M. H. Cryer ; Extraction of Teeth under Nitrous Oxid Anesthesia, By J. D. Thomas ; Local Anesthetics and Tooth Extraction, By Louis Ottofy ; Management of the Deciduous Teeth, By C. L. Goddard : Orthodontia Exclusively as an Operative Procedure, By C. L. Goddard ; The Development of Esthetic Facial Contours, By C. S. Case.

The marked ability of the authors alone should be a sufficient guarantee of the merit of the work. It is replete in every particular and treats the subject, as all good text-books should, in a progressive manner. It surpasses anything of the kind heretofore attempted, and the editor is to be congratulated on securing such efficient assistance in compiling this work. It is a book that every progressive dentist should possess, and we can heartily recommend it to the profession. The printing, paper, and binding, show the best work of the printers' art.

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SOME METHODS AND APPLIANCES IN OPERATIVE AND MECHANICAL DENTISTRY. By R. P. Lennox. London : Claudio Ash & Sons, publishers, 1897.

Dr. Lennox is one of the foremost workers in the field of mechanical dentistry in Europe, and has from time to time given the profession much valuable information through the dental journals. But in this book the author gives many of his original methods not to be found elsewhere. The work contains about one hundred and twenty pages, is well illustrated and indexed. It is teeming with practical ideas and useful hints that may be used in every-day practice. Such a book is helpful to every dentist and valuable as a book of reference.

BOOKS RECEIVED.

Injuries and Surgical Diseases of the Face, Mouth and Jaws.  
By J. S. Marshall, M.D. S. S. White Co., Publishers.

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SOCIETIES.

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Sections and Officers.

National Dental Association.

ORGANIZATION OF SECTIONS.

I. Prosthetic Dentistry, Metallurgy and Chemistry, including Crown- and Bridge-Work. Chairman, Grant Molyneaux; Secretary, R. R. Freeman.

II. Dental Education, Literature and Nomenclature. Chairman, B. H. Catching; Secretary, M. F. Finley.

III. Operative Dentistry. Chairman, J. Y. Crawford; Secretary, Frank Holland.

IV. Histology and Microscopy. Chairman, J. I. Hart; Secretary, T. P. Hinman.

V. Materia Medica and Therapeutics. Chairman, J. S. Cassidy; Secretary, L. P. Bethel.

VI. Physiology and Etiology. Chairman, J. D. Patterson; Secretary, L. E. Custer.

VII. Anatomy, Pathology and Surgery. Chairman, W. C. Barrett; Secretary, Geo. B. Clements.

VIII. Hygiene and Prophylactic Dentistry. Chairman, W. T. Arrington; Secretary, N. H. Thompson.

IX. Orthodontia. Chairman, V. H. Jackson; Secretary, L. P. Dotterer.

X. Clinics. Chairman, H. J. McKellops; Secretary, E. P. Beadles.

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Bi-State Dental Meeting.

THE Bi-State dental meeting of the Southwestern Michigan and Northern Indiana Dental Societies, will be held at Benton

Harbor, Mich., Tuesday and Wednesday, September 14-15, 1897. Benton Harbor is a beautiful summer resort on the shore of Lake Michigan, where two days of recreation may be enjoyed. All members of the profession are cordially invited to attend.

F. H. ESSIG, *Sec'y,*  
Southwestern Dental Society, Michigan.

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### Northern Iowa Dental Society.

THE third annual meeting of the Northern Iowa Dental Society, will be held at Mason City, Iowa, Sept. 7, 8, 9.

Arrangements already made indicate an interesting and profitable meeting. A cordial invitation is extended to all members of the profession to meet with us.

WILLIAM H. STEELE, *Sec'y,*  
Forest City, Iowa.

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### Officers Elected.

THE North Dakota State Board of Dental Examiners held their last meeting at Fargo, North Dakota, on June 8th and 9th. The officers elected for the ensuing year are: F. B. Foster, of Grand Forks, president, and H. L. Starling, of Fargo, secretary.

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### Resolutions Adopted.

THE Chicago Dental Society and the Odontographic Societies of Chicago, adopted the following Resolution, at their May meetings:

WHEREAS, The Dental Colleges and State Dental Boards of the United States have been charged by Dental Societies of Europe with methods which are not only degrading to American Dentistry, but result in a positive injury to the people, and are especially humiliating to skillful American Dentists practicing abroad;

IT IS CHARGED, and truly so, that foreigners unable to speak and understand the English language, and in many instances possessing limited or no knowledge of Dentistry, have been admitted to advanced classes of our colleges and permitted to graduate;

MOREOVER, that our State Boards have also examined such candidates through interpreters, and after receiving their certificates, these foreigners have returned to Europe and announced themselves as American Dentists.

RESOLVED: It is the sense of this society that all candidates for admission to our colleges be examined in the English language; also, that our State Dental Board conduct their examinations in English.

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## OUR AFTERMATH.

NEVER HAVE THE TOP OF THE SHOES tight, as it interferes with the action of the calf muscles, makes one walk badly, and spoils the shape of the ankle.—*Pac. Record*.

A GOOD LAW.—In Bulgaria the proprietors of a medicine by which they claim to cure a specified disease are liable to be imprisoned if the medicine fails to produce the desired effect.

SPIDER'S WEB TOUGHER THAN STEEL.—Size for size, a thread of spider's silk is decidedly tougher than one of steel. An ordinary thread will bear a weight of three grains. This is about 50 per cent stronger than a steel thread of the same thickness.—*Pacific Record*.

TAKE A VACATION,—Your mind will be clearer, your judgment sounder when you come back. You will bring a new fund of interest and energy to bear on what had become, perhaps, drudgery and monotonous routine. Your patients will feel the benefit of it, and you will reap a liberal interest on your investment.—*Med. Brief*.

SHEET IRON DENTURE. — Mr. Sidney Spokes exhibited a home made denture, taken from the mouth of a man 78 years of age. The denture, apparently, had been manufactured out of a piece of sheet-iron, upon which three bone blocks had been riveted with iron rivets. The man had stated that he had made the denture himself when he was an engineer in Portsmouth dock-yard, and had worn it for over thirty-two years.—*Jour. Brit. Asso.*

AMERICAN DENTISTS EXCLUDED FROM NATAL.—A correspondent in Natal says: "Our Dental Act has passed, and the first prosecution under it is about to take place; Government prosecutes. It is not necessary under this Act for a man to call himself a dentist, etc., the performance of a dental operation by an unregistered man is made penal; six months' imprisonment or £100 fine.

We think our Act an advance upon the British. Americans are excluded for the future, but L.D.S. men are accepted. There are now so many dentists in this colony that as they cannot all make a living some of them are leaving."

—*Jour. Brit. Dent. Asso.*

**SHE WAS AN OBSERVER.**—We believe the American public is far ahead of us in the care of its teeth, and this was smartly emphasized the other day in a conversation we had with an American lady. She had been informed that American dental diplomas were not recognized in Great Britain, and asked, "Is it true that American dentists are not recognized in this country?" We admitted that such was the case. "Well," she said, "I could not believe it at first, but after I had noticed the teeth of people out here, I felt sure it was the truth." We felt that to a certain extent the reproach was deserved. We shall improve in time.—*British Journal*.

**A FRIZE FUND.**—From *L'Odontologie* for May, 1897, we learn that at a meeting of the Académie de Médecine held on May 18, an extract was read from the will of M. Magitot, according to which he left to the Academy a sum sufficient to realize an annual income of 500 francs, which is bequeathed for the purpose of founding a biennial prize of 1,000 francs (£40), called "Magitot's prize," destined to reward the best work upon stomatology or odontology. In addition to this he also leaves to the Academy that portion of his library containing works on stomatology and odontology. Oddly enough the almost fanatical bias of Magitot against dentists is apparent even in his last will and testament, for none may compete for this prize unless they are *doctors in medicine*.—*Jour. Brit. Dental Asso.*

**A DOG WITH GOLD TEETH.**—It was a dog fight, nothing more or less, that deprived McGinty of his two best teeth. The cause of the disturbance is not known, but it may have arisen from a game law controversy, or from a general feeling or irritation resulting from the high dog license. Anyway, the fight went on until McGinty had his teeth broken off while defending his cause. McGinty is owned by Dr. Albert Robinson, and as soon as the final round was over, which deprived him of his teeth, he went slinking into the office with such an air of pain and dejection that an investigation was at once begun, which, in this case, proved satisfactory from all standpoints. McGinty showing more sense and good judgment than many of his superiors, jumped into the dental chair, yelped a few times and awaited operations. The doctor's son took him in charge, and the dog was held in the chair while the impression was taken; he even submitted calmly to the cotton packing process—his composure being no doubt largely due to the blissful ignorance of dental bills, and he neither whined nor howled when a gold crown was fitted and cemented on each of the broken teeth. In fact he seemed rather proud of it, and now he goes about displaying those two gold crowns, and is the envy of every dog in the neighborhood, and he never fails, on showing those two long, sharp fangs, to frighten all the smaller dogs into sudden terror. McGinty now enjoys the distinction of being on the "only living original" list, and the honor is likely to remain his unless a lot of other society dogs take up the idea and institute a gold tooth fad. In such case, McGinty, like every other benefactor, will sink into oblivion and be forever forgotten, while dogs with gold teeth will ornament the future bench shows.—*Grand Rapids Daily Paper*.

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## CONTRIBUTIONS.

### The Prominent Causes of Failure in the Use of Electricity in Dentistry.\*

BY C. S. NEISWANGER, M.D., CHICAGO, ILL.

ELECTRICITY is a natural phenomenon and the only way to accomplish results, either physical or therapeutical is to observe closely and try to interpret the language in which nature speaks to us. Electricity is closely related with some other forces with which we think we are familiar. It is but a mode of motion or other manifestation of a form of matter called the ether which permeates all bodies and pervades all known space.

Light is only a transverse vibration of this same ether, with infinitessimally short wave-lengths. Heat and sound are made apparent to us by the aid of longer waves of the same medium. Electricity is governed by laws which are as well known as those which regulate light, heat, sound and gravitation, all elucidated by mathematical process. All animal and vegetable life being due to, and dependent upon the electrical conditions surrounding them, is it not reasonable to suppose that we should be able to restore the equilibrium (health) of the body by supplying electricity from some outside source?

\* Abstract of Paper read before the Southern Dental Association, Old Point Comfort, Va., August, 1897.

The editor and publishers are not responsible for the views of authors of papers published in the OHIO DENTAL JOURNAL, nor for any claims that may be made by them.

To comprehend the subject of electricity there are three fundamental principles which must be observed :

First—*Voltage*. This is not electricity itself but the force which impels it—push-power—produced by a difference of electric level.

Second—This voltage, or difference of electric level, is caused (if we are doing cataphoric work with a battery of cells) by the difference of potential between the two elements within the cells. If two pieces of metal are immersed in an acid or other existing fluid, one of which is acted upon by the acid much more readily than the other, the voltage will be in proportion to the difference with which the two metals are acted upon by the fluid. Two metals having a great difference of potential will give a high voltage or push-power.

Third—Amperage is electricity or current; it must not be confounded with voltage. We may represent this by a rain; the water represents the amperage, the swiftness with which it flows the voltage; hence as we may have a broad river flowing slowly, or a narrow stream running swiftly, so we may have high amperage and low voltage, or vice versa.

There are three factors in the causes of failure in this class of work :

- (1). The battery.
- (2). The controlling device.
- (3). The manipulation of the electrodes.

(1). The galvanic current—the direct or continuous current generally utilized in dentistry, is produced by chemical decomposition; the conversion of chemical energy into electric energy. If we would generate electric energy sufficient for our purpose, we must have a corresponding consumption of the fuel that keeps up the chemical decomposition and this fuel must be renewed as required. Hence the failures of those who are seduced by the attractive advertisements of those who furnish a battery of a few cells as large as a man's finger guaranteed to do heavy work for years. In dentistry we have a heavy resistance to the passage of the current to overcome, and as it is the current or amperage that does the work, we must have sufficient voltage or push-power in our battery to overcome this resistance.

(2). The controlling device should be capable of controlling the current in absolutely gradual gradations, and not by steps, or

cell by cell, as this would cause very great pain in a hypersensitive cavity. An instrument in which the resistance is composed of German silver will, for instance, be objectionable, because the passage of electricity generates heat, and when the wire is heated, resistance is increased and the current drops back and has to be re-established by a forward movement of the instrument. This is a very prominent cause of failure not heretofore recognized. With the wire rheostat there is a constant fluctuation of the current backwards and forwards. With the graphite instrument a steady but gradual increase of current is maintained.

The term "Volt selector" means nothing. A volt selector is a current controller and the more voltage or pressure you have, the more current is pushed through the resistance we encounter. It is the amount of current that does the work and a milliamperemeter is the proper thing to have in the circuit that we may know how much current is passing through. Although the amount of current necessary in any certain case has never been definitely determined, it is a satisfaction to see the indicator upon the meter move and to know that the patient is getting no more, no less, than is indicated upon its face.

Let the battery have at least a pressure of forty or sixty volts. Less may do some of the work but you have a reserve force for other cases. Your current controller should increase and decrease the resistance gradually and not by steps. It should be of graphite or carbon, with the patient in shunt. The electrode should be supported and controlled by the hand. A good meter with range of scale to five or more milliamperes, graduated in one-tenth milliamperemeter divisions, should be in the circuit. With such apparatus, and by paying due regard to polarity and the electro-sensibility of your patient, you will have no reason to regret the use of this valuable agent. If you have not the time to devote to it do not attempt its use. If you are not overburdened with practice there is no better way to increase it, by its judicious use.

#### DISCUSSION.

DR. J. ROLLO KNAPP asked Prof. Neiswanger to explain why, in view of the decomposition and waste of the two metals used in the battery cells, there was not a corresponding waste in the two metals used as fillings in a tooth. Is the loss so very gradual that

it is imperceptible? Dr. Neiswanger replied that it was probably because the two metals were not kept submerged.

DR. MARSHALL said that Dr. S. B. Palmer had established the fact years ago, that there is a current between the two metals in a tooth until the surface is oxidized, as seen in the blackened surface of an amalgam filling.

PROF. NEISWANGER spoke of the importance of knowing which pole to use in applying medicaments. If potassium iodid is used at the negative pole the iodin would act as an acid and seek the positive pole, the potassium remaining at the negative. On the other hand, if the potassium iodid was applied on the positive pole, the iodid would remain at the positive and potassium, the metallic base be carried to the negative and left in the tissues. If a copper needle is used for the positive pole the copper would be decomposed by the action of oxygen, the copper going to the other pole; and in this way it would almost equal bichloride of mercury, besides being non-toxic. Solutions or compounds are always decomposed, the base remaining at the negative, provided there is sufficient current to effect the decomposition. With cotton and the alternating current you can produce a local anesthesia of the tooth tetanizing the nerve through fatigue of the muscle.

DR. JOHN MARSHALL said that he had valuable results in that line, in relieving pain and reducing inflammations and congestions. No medicament is required, the current itself contracting the muscles of the blood vessels and producing anemia of the parts.

DR. PRICE spoke of the various theories as to the action in cataphoresis, and said: When all the various theories have been analized we are forced to the conclusion that it is electrolysis, pure and simple, with perhaps some osmosis.

## Phenomena of Cataphoresis.\*

BY WESTON A. PRICE, D.D.S., CLEVELAND, O.

In this paper I shall confine myself to the consideration of phenomena attending the application of an electric current to the human body, with and without an interposing medicament, and especially as applied to the dental organs.

There are three distinct theories as to the forces at work and their particular action in these processes, and since there is such a diversity of nomenclature, and variety of methods for the application of these forces, I shall include all the methods of applying an electric current to the dental organs for producing anesthesia, whether used in conjunction with a medicament or not. These theories are: First. The polarization of the tissue producing an inhibition of the sensory impulse. Second. Osmosis. Third. Electrolysis.

The first theory provides that when an electric current is applied to a tooth, with or without a medicament, the conditions produced are almost or entirely due to the effects of the current and not to the medicament, other than as an assistance in conducting a current. The supporters of this theory are here divided into two classes, from a difference of opinion as to the exact method of this inhibition, whether the decreased excitability is due to the polarizing effect of the current on the tissue, or to its inhibition of the normal sensory impulse by its passage through the nerve.

So far as I know, the leading advocate of the former theory, is Prof. Neiswanger, of the Post-Graduate Medical School of Chicago. I have also heard Drs. Husted, Oberlin, and Heise, Cincinnati, and some others, favor this theory.

Prof. Neiswanger, of Chicago, has said that, owing to the liberation of hydrogen at the negative pole and of oxygen at the positive pole, there would be at these two regions, respectively, a condition of increased and decreased excitability, due to the production of an acid condition at the positive pole and an alkaline condition at the negative pole, and that the zone of neutrality would be the median of resistance; and consequently that the

\* Paper read at American Dental Association, Old Point Comfort, Va., August, 1897.

negative or indifferent electrode should be placed as far as possible from the polarizing electrode. The adherents of this polarization theory maintain that the amount of current used is not great enough to produce sufficient electrolysis of the medicament used to produce its effect on the tissue.

The other division of the first theory is, that a constant current applied to the dental branches of the tri-facial nerve, with the positive pole applied to the tooth, and the negative pole over the Gasserian ganglion, inhibits the normal sensory impulse. The leading advocates of this theory maintain that a certain and intricately definite amount of current applied in the manner just described will produce a condition of anesthesia in the tooth, and that either too little or too much will not produce this condition. They call it "short circuiting the nerve." For its application the positive pole of the constant current is attached to the dental engine in such a manner as to make the bur the electrode, the handpiece being insulated, and the negative pole is applied over the Gasserian ganglion, on the same side as the tooth to be operated upon, which is perfectly insulated. No medicament is used in either of these two processes except moisture in the former, the polarization theory to reduce the resistance of the dentin. In the latter the cavity is dehydrated.

The next theory provides that the medicament, which is applied under the electrode, is the agent which does the work, but that it is carried in by a physical force, just as a stream of water carries sediment with it, so the electric current carries the ingredients in solution with it through the solvent and through the tissue. The advocates of this theory have furnished almost all the literature that has been written on the detailed *theory* of cataphoresis since its revival, and amongst its ranks are to be found many of the foremost men in the dental and medical professions. The most exhaustive articles, bearing out *this* theory, have been written by Drs. Morton, Peterson and Phillips, while a number of shorter articles have appeared from other writers.

To secure the conditions best suited for the development of this theory, the positive pole is placed in the cavity or on the tissue to be anesthetized with an interposing layer of the obtunding medicine, and the negative pole placed at any more or less remote place. Dr. Morton has said, " You may even drive solid particles into tissue, and solid particles will move through fluids

by the aid of electricity." He also says, " You cannot be too sure of your osmosis."

Dr. Peterson, in the International System of Electro-Therapeutics, says, " From a medical standpoint we understand by cataphoresis the introduction of medicaments by means of electricity into the body through the skin or mucous membranes. It seems to be a *purely physical process* and has nothing to do with electrolysis."

Electrolysis provides practically that all the effect produced in passing an electric current through a medicament, as applied in cataphoresis, is electrolytic.

I have not been able to find a single person amongst the writers for the medical and dental profession defending this theory, though I understand it has been suggested. It may, however, be worthy of consideration. As the next steps let us consider :

First: The physiological effect of a constant current on nerve tissue.

Second: The laws governing osmosis.

Third: The laws governing electrolysis.

For the study of the first, take for convenience, the sciatic nerve of a frog. Apply the electrodes of a polarizing current to two distant points from each other on the nerve. Before considering the phenomena of muscular contraction let us observe the conditions this current produces in the nerve relative to any other irritant applied to that nerve. Suppose the irritant to be mechanical, not electrical, to prevent confusion with the polarizing current. The negative pole of the polarizing current, is placed nearest the muscle. The following phenomena will be observed :

First: That the nerve at different points has altered excitability, at some places less than the normal amount of stimulation will produce a contraction of the muscle, while at other points it will take far more than the normal amount of stimulation to produce this contraction, due to the passage of the current.

Second: It will be found that these regions of *increased* and *decreased* excitability are confined to the vicinity of the particular electrode; the region of decreased excitability about the anode, or positive electrode, and the increased excitability about the cathode, or negative electrode.

Third: There is a point between the electrodes of normal

excitability, which point *varies* in distance from the respective electrodes according as the current is *weak or strong*.

Fourth: The *degree of decrease or increase* of excitability is in *direct proportion* to the strength of the polarizing current.

Fifth: This condition ceases at practically the instant the current is broken.

The alteration of excitability in the region of the poles we will know as *electrotonus*; that at the positive pole, or anode, as *anelectrotonus*, and that at the negative pole or cathode, as *catelectrotonus*. These terms have been used by different physiologists to express two different conditions.

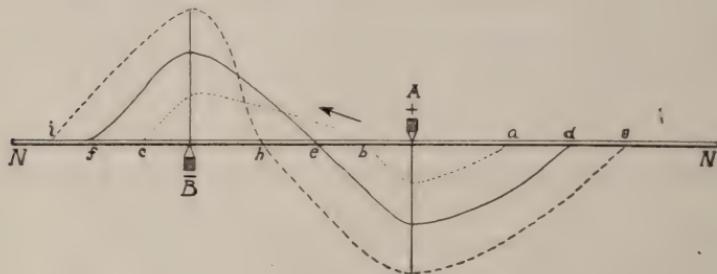


FIG. 1.

In 1843 du Bois Reymond discovered that the passage of a constant galvanic current through a portion of a nerve, produced a change in the electro motive forces existing between the longitudinal and transverse surfaces, whereby the resulting *nerve-current* was either increased or diminished, according to the direction of the constant current. To this condition he applied the term *electrotonus*. It was subsequently shown by Pfluger in 1859, that a definite change in the irritability of the nerve is also caused by the passage of a constant galvanic current, and as it is intimately related to the change in the electro motive forces, he applied to this *alteration of excitability, also the term of electrotonus*. This will be the application of the term in this paper. He showed very clearly by the diagram (Fig. 1) the relative effects of different terms. "The abscissa line N-N represents the nerve, the decrease in the excitability of which is indicated by an ordinate directed downward, and the increase in excitability by an ordinate, directed upwards. The electrodes conveying the current to the nerve are represented by "A" the positive and "B" the negative pole. The relative extent of the alterations of

the excitability as revealed by the energy of the muscle contraction following the application of a uniform stimulus, is shown by the curves, the size and extent of which represent the changes produced by a weak, medium, and strong current. The curve also shows that with a weak current a, b, c, the excitability in the anodal (positive) zone is decreased, and in the cathodal (negative) zone, increased, and that the neutral point b, lies close to the side of the positive pole. From this point the changes in excitability gradually increase and reach their maximum in the neighborhood of the electrodes, from which both phases gradually decline. The position of the neutral point also indicates that by far the larger portion of the intra-polar region is in a condition of increased excitability, or catelectrotonus. The curve d, similar in its general form to the preceding represents the alterations in the excitability produced by a current of medium strength ; in direct proportion with the increase of current-strength, there is an increase in the amount of anelectrotonus and catelectrotonus, and the distance to which they spread themselves into the extra-polar regions. The indifferent point has advanced toward the center of the intra-polar region, indicating that this portion of the nerve is almost equally occupied by the opposite states of excitability. The curve g, h, i, represents still further the changes following the employment of a strong current. The neutral point has now been shifted toward the cathode and the intra-polar region is in a condition of anelectrotonus." These changes in excitability are not dependent upon or related to the special nature of the stimulus, for they exhibit themselves upon the application of all forms of stimuli, whether mechanical, chemical or thermal. The degree of electrotonus is in direct proportion to the strength of the constant current, even to the point of the destruction of the continuity of the nerves. This is a very important fact.

"The foregoing laws pertain to motor nerves. Nothing analogous has yet been observed in secretory nerves, but Donders confined it in his experiments upon the inhibitory fibers of the vagus." *Does an analogous condition exist in sensory nerves?* This may be observed later.

These preceding laws, as also the laws of contraction produced by an electrical stimulus, have been established on the isolated nerves of frogs, under abnormal conditions. Can they be verified on the living human body? Yes and no. Not of course

under the same conditions, though they can under very complicated conditions. Why can they not? Because of the nerves being surrounded by tissues of different degrees of resistance. This will be the key to the answer of one of these theories.

Suppose the positive pole be placed in a tooth and the negative over the Gasserian ganglion, and suppose, for argument, that the sensory impulse is inhibited, just as the motor is,

WILL THE CURRENT TRAVEL ON THE NERVE OR ON THE  
SURROUNDING TISSUE?

To determine this I chloroformed a dog, and with expert assistance dissected out the inferior dental nerve from near the base of the skull to the inferior dental foramen and insulated. The inferior cuspid on the same side was excised and insulated and an electrode placed in the pulp tissue. With very great care the resistance through the path (pulp and nerve) was determined and found to be 23,630 ohms. The resistance through the path (the pulp to a point equi-distant away on the muscle), with the same electrodes, was determined and found to be 18,570 ohms, 5,060 ohms less than that of the nerve. This means simply that if the Gasserian ganglion were right on the surface and the negative pole applied to it, the amount of current passing through each, the nerve and muscle, would be inversely in proportion to their resistance. But the nerve does not come to the surface, hence the current to pass through the nerve must travel along on it to a point opposite the negative electrode, and then pass out through the tissue to the surface, which the advocates of this theory claim it does. But an electric current always seeks the path of least resistance, so to fulfill the requirements of this theory the resistance through the nerve would have to be infinitely lower than the resistance of the surrounding tissue. A point of interest here is that the cross-section resistance of a nerve is still five times greater than its longitudinal resistance. The facts are that the current would diffuse throughout the entire tissue of that side of the face, and the amount of current flowing through the nerve at any point in cross-section would be less than that flowing through the same cross-sectional area of the tissue at any point around it, within a wide area. Hence the theory of *short-circuiting* a nerve is inconsistent and its accomplishment in dental therapeutics clearly impossible. I have demonstrated this on the

inferior maxillary of a sheep and on the sciatic nerve of a frog. This is a very important consideration, as it determines to a great extent the possibility of realization of the fundamentals of both the inhibition and the polarization theories. It was because of this fact that Erb in 1867 failed to verify on the human body the laws established by Pfluger in 1859. He found as a constant result of many experiments that there occurred a diminution of excitability in the extra-polar catelectrotonic region and an increase of the extra polar anelectrotonic region. Helmholtz subsequently demonstrated that the cause of this deviation from Pfluger's law is the position of the nerve in the uninjured body. He says, "Since the nerve is in a position surrounded by a well conducting medium, even better than itself, the current density in the nerve must rapidly decrease with distance from the electrode. Whilst, of course, under the polarizing electrode the current density in the nerve is the greatest, this density, on account of the moist conductors surrounding the nerve, so rapidly decreases that it becomes almost *nil* for the nerve at even a short distance from the electrodes. At a small distance from the positive pole, therefore, the density is so slight that it may be assumed without error that the current now leaves the nerve, or in other words, the cathode (so far as the nerve is concerned) is to be found at this point. It is to be expected, therefore, that the effects of the opposite pole would be observed at only a short distance from the applied pole."

Erb at this suggestion renewed his investigations, eliminating this error and got results harmonizing perfectly with the laws established by Pfluger. (For his method of eliminating this error, see Bigelow's International System of Electro-Therapeutics).

This fact was more thoroughly established by Waller and de Waterville (Physiological Transactions of the Royal Society, 1882,) to which reference can be made, or to Waller's Human Physiology, 1891, page 363.

(To be continued.)

## Bridgework.\*

BY DR. I. N. CARR, DURHAM, N. C.

THE beauty of all artificial work lies in the ability of the artist to conceal his art, and nowhere is this more desirable than in prosthetic dentistry. In bridgework there are various elements which enter into its proper construction, three of which I desire to mention :

*First.* It must have strength to withstand the stress of mastication.

*Second.* It must be cleanly.

*Third.* It must be artistic in the sense I have mentioned.

Suppose a case requiring the use of a superior cupid tooth for treatment. To crown the cupid with gold would be extremely inartistic ; to cut it down sufficiently to put on a "window" crown would injure the shape of the tooth, besides showing an unsightly band of gold at the cervical margin. How then shall we secure one end of the bridge to this tooth in the strongest and most artistic manner ? Briefly stated I would proceed as follows : Grind the palatine surface of the tooth sufficiently to allow a cap of gold to fit over it ; then drill three pits, sufficiently deep to cement in three platinum pins, the size of the pins used in artificial teeth, drilling the pits at point most distant from the pulp. Burnish a piece of platinum foil over the surface of the tooth that you have ground down ; trim it to shape and thrust the platinum pins through the foil into the pits, allowing them to project sufficiently to come away with the foil when removed, which now proceed to do by means of "sticky wax" softened, and pressed over the foil and pins. Invest in plaster and very fine marble dust ; when this has set remove the wax and flow pure gold or 22-k. gold solder over the platinum and pins sufficiently thick to give the necessary strength. With this in position take impression, make articulating model, back up your teeth, put in place and solder. By this method no gold shows except at the tips of the porcelain teeth, and possibly a gold tip on the cupid. This method was evolved from the fertile brain of our fellow-member Dr. C. C. Alexander. I speak of the advantages of this method of construction in bridgework from personal experience, as I have one in my own mouth, besides having made others to the perfect satisfaction of my patients.

\*Abstract of Paper read before the Southern Dental Association, Old Point Comfort, Va., August, 1897.

## The Misapplication of Gold Crowns in Bridgework.\*

BY DR. W. W. H. THACKSTON, FARMVILLE, VA.

AFTER reviewing in scathing terms the degradation of prosthetic dentistry by the "Cheap Johns" after the advent of rubber and the base metals, until it became a question among the better class of honorable men in the profession of sloughing off the prosthetic department altogether and leaving it in the hands of the men who had succeeded in almost entirely monopolizing the patronage of the people who became infatuated with the idea of cheap dentistry, Dr. Thackston drew an equally vivid picture of the more recent revival and the reinstatement of gold and platinum, and the introduction of comparatively new operations of crowning with gold, worn, decayed and broken-down stumps of natural teeth and the substitution of "Bridges" for the more cumbrous plates.

With correctly made and judiciously applied crowns and bridges, and with an imperishable *plastic* tooth-filling stable, non-shrinkable, inexpensive, and of shades and colors matching the natural teeth, the very perfection and ideal of prosthetic and operative dentistry would be realized.

But, alas! We have not yet discovered the unchangeable "plastic" and the misapplication of crowns and bridges, their faulty construction and equally faulty adjustment disappoint and disgust our patients and create distrust of our resources to meet their wants and fulfill our promises of ability and comfort. We are witnesses to too many gross violations of all hygienic and asthetic rules and requirements.

The safe and sure maxims for our prosthetic brotherhood, are as follows:

*First*—A sound and healthy condition of the hard and soft tissues of the mouth, including the gums, membranes, teeth, and roots of teeth.

*Second*—Porcelain "crowns" and "facings" for all anterior and exposed teeth.

*Third*—Perfect adaptation and artistic finish for each and every piece designed for insertion in the human mouth.

\* Abstract of Paper read before the Southern Dental Association, Old Point Comfort, Va August, 1897.

## Continued Study of the Relations of the Frontal Sinus to the Antrum.\*

BY DR. THOMAS FILLEBROWN, BOSTON, MASS.

DR. FILLEBROWN in this paper reviewed briefly his report of last year upon eight instances of what has been considered an abnormal anatomical condition, namely: When the infundibulum continues directly to, and terminates in the foramen of the antrum, a fold of mucous membrane extending above the foramen forming a pocket, from the bottom of which the opening into the antrum is situated, thus directing any discharge coming down the infundibulum into the antrum, no abnormal discharge from the frontal sinus escaping into the nasal passage until the antrum was so filled as to cause a backward overflow. Finding this condition to exist in eight subjects examined by himself seemed to imply that the presence of this pocket membrane was the normal formation.

In the present paper Dr. Fillebrown reports the examination of fifteen heads in the Harvard dissecting room, in every one of which this condition was found to exist (with some minor variations only sufficient to prove the rule), giving a total of twenty-three cases, a number sufficient in his judgment to establish the fact of the normality of the anatomy of the parts.

\* Abstract of Paper read at American Dental Association, Old Point Comfort, Va., August, 1897.

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## Report of a Case Verifying the Statement First Made by Dr. M. H. Cryer, showing Direct Communication of the Frontal Sinus with the Antrum of Highmore.\*

BY T. W. BROPHY, M.D., D.D.S., CHICAGO, ILL.

THE superior right bicuspid and molar teeth had been removed and a small opening made into the antrum before the case came into the hands of Dr. Brophy, irrigation being carried in by syringing daily with the usual antiseptic solutions. No satisfactory progress being made in arresting the disease, the patient was

\* Abstract of Paper read at American Dental Association, August, 1897.

taken to Dr. B. for diagnosis. Exploration by means of a silver probe revealed no diseased bone, and a more extensive opening and also a more thorough drainage was recommended. The patient seemed at first to improve after the operation, but after home treatment for two or three months, returned in the original condition.

It was then decided to remove a greater portion of the anterior wall of the antrum. The operation revealed a thickening of the mucous membrane with polypi upon its surface, besides a small piece of rubber tubing which had been lost in the cavity. The cavity was thoroughly curetted, packed with boracic gauze, the packing was removed daily for about a week, when a hard rubber canula was made retaining the full size of the opening, preventing the closing of the opening by granulations and enabling to thoroughly irrigate the cavity and watch the process of repair.

The accumulation of pus persisted at the upper nasal surface of the cavity, and after two or three months of the most vigorous treatment, it was decided that the frontal sinus must be involved. Accordingly an operation was made opening the sinus, which was found to be filled with pus. The anterior wall of the frontal sinus was removed exposing the cavity to view when it was found to be denuded of membrane. By carrying the incision downward along the inner canthus of the eye a silver probe was passed directly into the cavity of the antrum without obstruction. Water was forced into the frontal sinus which readily found its way through into the antral cavity. Pus also dribbled from the region of the ethmoid cells. These cells were curetted, some diseased bone removed, and the whole thoroughly irrigated. Irrigation and antiseptic dressings together with the insertion of a drainage tube, completed the operation, suppuration finally ceasing, though a thick glossy mucus occasionally comes from the nasal cavity. This case, in the judgment of the writer had its origin in a dental alveolar abscess of the teeth which had been removed before the patient came to him. The cure of cases of this character could not possibly be effected by opening and treating the central cavity alone.

The feature especially presented was the anatomical relation of the frontal sinus, infundibulum and antrum of Highmore.

## Relations of Chemistry to Dentistry.\*

BY J. S. CASSIDY, M.D., D.D.S., COVINGTON, KY.

DENTISTRY is and should be cosmopolitan. It appropriates with due permission facts and methods from the humblest as well as the most exalted occupations, and in return gives back to them a large per cent of the benefits received. Metallurgy, molding, sculpture, surgery, medicine, physics and chemistry have been appealed to not in vain: and as a consequence the accomplished dentist could point out to willing youth the best means of becoming experts in these separate vocations.

Of all these sciences that of chemistry is the most universal, since it has no limitations; all forms of matter and force must own its sway. To chemistry our profession is indebted in that it prepared  $N_2O$ , by which means in after years Dr. Horace Wells, a dentist, might be permitted to introduce anesthesia, the greatest boon ever conferred on suffering humanity.

Dentists, as a rule, are not indifferent to nor ignorant of chemical processes; notwithstanding our friend, Dr. Crouse, asserted there was not a single dentist in this country who could make an accurate quantitative analysis of any dental amalgam; whereas hundreds might be named who could do so, if it were necessary. Indeed, there are many men, not professional chemists, who are able to do excellent work along lines of chemical discovery and manipulation. The recent studies of the chemical and physical properties of amalgams are of inestimable value to every dentist who thankfully takes advantage of the information derived through the labors of Dr. Black.

Moreover, not to mention the innumerable pharmaceutical preparations, our zinc oxide cements may be brought in evidence; and as some of us are sure that fillings of these materials are disposed to disintegrate more at the cervical point than elsewhere, we also think we know the true and only cause of this unfortunate disposition, in that the part under or near the gum margin is the favorite point for alkalin fermentation, such as the production of ammonia, resulting in the inevitable abstraction by it of

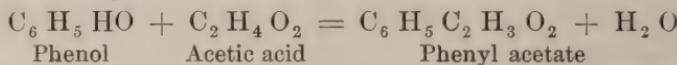
\* Abstract of Paper read before the American Dental Association, Old Point Comfort, Va., Aug., 1897.

the electro-negative substance of the cement. Some may be inclined to consider this brief allusion to cause and effect as "only a fine spun theory," but it is not; it is as susceptible of proof as any problem in mathematics.

We cannot, as dentists, escape, even if we desire, the claims of the science of chemistry upon our earnest attention and study, for on every hand we are compelled to admit the insidious influence of its affinities to be the exciting and efficient cause of the principal disease with which we have to contend. Happily, the study of chemistry, while acquainting us with these potent influences, also points out to us within the sphere of the same science the means at hand to combat them, most beneficially provided, if we will but apply them.

No member of this—as the late Dr. Atkinson termed it—"Excelsior Association of Dentists" will doubt the culminating discovery of Dr. Miller, that at least lactic acid is developed in the mouth by the presence of bacteria and the materials necessary to their support, and also to the play of chemical affinities at the point of carious destruction; and, further, that the destroying agent acts molecularly with as definite results as pertain to any other natural phenomenon. Some years ago, when the so-called "germ theory" of disease was introduced, there was not a few who received the innovation with satisfaction; because they would not or could not understand, and therefore approve, the chemical theories of Watt. It is now, however, accepted beyond question that there is no conflict between the two theories—that bacteria are a necessary factor in fermentation, and that their only trysting-places are in the midst of extraneous material susceptible to that process, the elements of which must obey the laws of their affinities; and if, for instance, among other compounds, destructive and otherwise, lactic acid, as proven by Miller, is developed in contact with a tooth, destruction of that part will proceed molecule by molecule; so that, while it is probable that teeth, like other organs, yield to an increased non-resisting influence of a "periodic law," dental caries is *per se* a disease of purely chemical propagation. From this latter view-point the relations between chemistry and dentistry are not of the most amicable character, yet the science whose unseen minions are directly responsible for the exigency of our principal enemy will inevitably furnish weapons of defense other than we as yet possess.

No wonder that dentists are perhaps unconsciously more interested in chemistry than are the members of the mother profession ; at least, it would so appear by personal contact with them, and by impartial reading of medical and dental journals. One of the former recently, to cite a single example, expressed his surprise that any two acids could neutralize each other ; and then went on to say, that by mixing one part of acetic acid, and one and one-half of carbolic acid, a neutral compound will result. Any tyro in organic chemistry knows that phenol is not an acid, but on the contrary is an alcohol, and that an alcohol and an acid combined will produce an ester, and water :



It goes without saying that a foreknowledge of certain rules in chemistry is a great aid in adapting means to ends, when anything new in that line appears. For instance, in cataphoresis, we were told at first that the positive pole must be used in contact with whatever drug was employed ; whereas it is well known in electrolysis that the radicals or ions of conducting-compound liquids separate in a perfectly definite manner, the positive radical being attracted to the cathode and the negative to the anode ; so that we will likely obtain better results by selecting anaphoresis when we wish greater penetration of a strongly electro-negative radical. A duly certified list of comparative positive and negative classes of radicals has been known for many years, of which we are welcome to take advantage ; and in return for all these favors, would it not be an act of courtesy on our part to approve, when occasion permits, certain changes in chemical nomenclature, adopted through official international committees appointed for the purpose, by the most influential scientific bodies ? Our journals, it is almost unnecessary to say, editorially are fully up to, indeed, in advance of the times, but we see too often in reports of discussion in our local societies, and in some of our latest textbooks, names of things and terms that shock the sensibilities of euphony and truth. Take for example, *Potassium iodid*. Is not that name more pleasant than iodid of potash, especially when we realize that the compound contains no potash whatever ?

We have been surfeited for a long time with "cocain hydrochlorate," and lately with "euain hydrochlorate," although a generation ago it was decided that acids like hydrochloric (HCl),

hydrobromic (HBr), etc., whose electro-negative radicals are elementary, confer names on salts which terminate in the *ide* (the final "e" has been eliminated); therefore the name of every salt of such acids should end in "id," as "cocain hydrochlorid." Only those acids which have compound negative radicals give names to salts ending in "ate" or "ite," as the case may be. Sulfuric acid ( $H_2SO_4$ ) forms sulfates; sulfurous acid ( $H_2SO_3$ ) sulfites; chloric acid ( $HClO_3$ ) chlorates; chlorous acid ( $HClO_2$ ) chlorites, etc.

Life is too short to nominate for consideration at this time more than one other frequently misapplied word, which is "density." We use it, do we not? as a synonym for hardness in the structural substance of teeth, instead of in the true meaning, i. e., specific gravity. Ice is harder and more compact to a cutting instrument than is liquid water, but it is less dense. The diamond, among the hardest of bodies known, is only three and one-half times as heavy as water; while pure gold is comparatively soft, although more than nineteen times as heavy as the standard, water. It is not possible to believe that the specific gravity of a tooth has anything to do with predisposition to disease, or even that compactness of calcium constituents is a condition that presents a physiological barrier to decay. While these matters may perhaps appear of small practical importance, yet surely, as we claim to be devoted disciples of pure science, we have no right to trifle with the accepted nomenclature.

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### The Libby Method.\*

BY DR. J. L. WOLF, WASHINGTON, D. C.

HAVING had during more than eighteen months' experience opportunities for observing the most gratifying results from the use of the Libby hand-pressure gold pluggers, supplemented by the Rogers mallet points, especially in those cases which, by virtue of unusual difficulty attending the insertion of the filling, furnished excellent tests as to the efficiency of the instruments, it seems of sufficient importance, and this a fitting occasion, to call the at-

\* Abstract of paper read at Southern Dental Association, Old Point Comfort, Va., Aug., 1897.

tention of those who may not be entirely satisfied with the results obtained by the generally accepted methods. The feeling of confidence as to the results which follow the use of this method contributes greatly to avert much of the sensation of exhaustion often experienced.

As mallet points supplementing the Libby hand pluggers, the Rogers points are of incalculable value for the two-fold purpose of conservation of physical strength and condensation of material. With the Russell electro-magnetic mallet as the propulsive power they are capable of a very wide range of application.

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### The Amalgam Question.\*

BY J. N. CROUSE, D.D.S., CHICAGO, ILL.

THERE are elements of uncertainty about amalgam and its use in dentistry which are more than trivial. Whether performed thoroughly or in the most careless manner, fillings of amalgam are far from satisfactory. What is the stimulus to put forth our best efforts in the use of a second-best filling material, when out of more than sixty different preparations, accurately tested, not one met all the requirements for a good filling material? We are indebted to Dr. G. V. Black for the first scientific method of testing amalgam, but the average dentist is without any means of determining the quality or behavior of the material that is more used than all others combined. It is entirely guess-work in making a selection without an elaborate and expensive outfit and the expenditure of much time in careful work. A common fallacy in the selection of an amalgam is that it must be very plastic and easily mixed. This is a great mistake, as it is impossible to pack it perfectly in a cavity. Another mistaken idea is that it is injured by manipulation after it commences to set. The exact opposite is true, for a stronger and better mass can be made if the amalgam be put to place by heavy hand pressure or by malleting after it has fairly begun to set.

A third fallacy is that the least amount of mercury possible

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\* Abstract of paper read before the American Dental Association, Old Point Comfort, Va., Aug., 1897.

to make the mass pliable is the correct manner of mixing, but in this case again the opposite is true.

Having brought with me a micrometer and dynamometers, and other implements, I invite inspection and practical tests. Many essential qualities can be shown and great benefits gained by taking part in this work.

## Opening the Bite with Cap-Fillings, Preserving the Vitality of the Pulp.\*

BY M. F. FINLEY, D.D.S., WASHINGTON, D. C.

IN the case described the patient, a male aged 62 years, had every tooth present in the upper jaw, and all in regular position, except the left cupid, which closed inside. The teeth were so peculiarly worn that when the jaws were closed the superior incisors came in contact with and pressed upon the lower gums, the incisive edges of the lower incisors also impinging on the upper gums when the teeth were closed. The outer cusps of the upper molars also came in close contact with the gums of the lower jaw, forcing the food into painful contact with the gums, causing great discomfort. The molars being sound, with living pulps, it was decided to open the bite by means of cap-fillings upon the second bicuspid and first and second molars on the left side lower jaw, the second bicuspid and third molar right lower heavy crowned to carry a bridge to replace the lost first and second molars, the occlusion being raised to correspond with the opened bite.

The occlusal surfaces of the teeth to be capped were ground to nearly a plane surface and caps adjusted by means of platinum pins entering four holes in the molars and three in the bicuspids, very carefully located in the centers of the sides, avoiding the cornua. The caps and bridge were all cemented to place at one time to avoid irritation by pressure on a single tooth or on one side of the jaw.

Models, photos and similar cap-filling accompanied the paper.

\* Abstract of paper read at American Dental Association, Old Point Comfort, Va., Aug., 1897.

## Structural Development.\*

BY C. N. PEIRCE, D.D.S., PHILADELPHIA, PA.

IN connection with Section VII, Dr. W. C. Barrett, chairman, placed on exhibition an immense collection of human and comparative odontology which Dr. Peirce described as presenting an array of landmarks rarely seen in a meeting or an association of professional individuals, unless of a strictly scientific character. He said: Each one of these representations has a history, and from each one, the nearest akin but more complex, has derived some organ, trait or peculiarity essential to his being, and this is true from the most simple to the most complex—from the Batrachian to Man.

The organs which are held in common indicate the road that has been traveled from the most primitive to the most highly specialized. The general plan of construction was a unit: the divergencies in response to the necessity of adaptation to environment, intensified by inheritance. It is a recognized fact that any change in the circumstances, that is, in the sum total of influences affecting any organism, will be likely to work some alteration in that organism or in its descendants, or in both.

The teeth are of more interest to the dental profession than any other set of organs considered separately, and yet these organs subserving nutrition cannot be studied without a marked correspondence with organs being noted.

A suggestive query is, "Are the teeth, with other organs of living beings, adaptive or non-adaptive? Are they machines especially fitted to meet the demands of their environment, or are they not?" The question, "Did the occasion for its use follow the appearance of the structure, or did the need for the structure precede its appearance?" is answered in the words of the late Prof. Cope, "Animals and plants are dependent for existence on their environment;" "Changes in environment occur without any preparation for them on the part of living things." "The influence of environment is brought to bear on life as it is or has been and special adaptations to it on their part must follow,

\* Abstract of paper read at American Dental Association, Aug., 1897.

not precede, changes of climate, topography, population, etc." Another important consideration is the well-known and recognized influence of use, motion, on nutrition—the law of use and effort—kinetogenesis.

In the study of the teeth it is not difficult to recognize that there are certain central or primitive types, from which it is easy to derive other related forms of dentition by simple addition, subtraction or modification of parts already possessed. The so-called teeth of the invertebrates are enderonic in origin—an oral armature with nothing in common with the teeth of vertebrates except their similar functions. The teeth of the vertebrates are enderonic in origin, in shape and function ranging from a simple cone for seizing and retaining, to the incisors for cutting, canines and carnivorous molars for tearing or lacerating, and tubercular for crushing, and the complex grinding molar of the omniverous and herbiverous for the trituration of food.

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### The Study of Anatomy.\*

BY W. C. BARRETT, M.D., D.D.S., M.D.S., BUFFALO, N. Y.

THIS association has wrought a great work in securing the adoption of something like uniformity of action in the admission of students, and in the raising of the general educational standard. If one would have some comprehension of its beneficent influence, he has but to reflect upon what was the general character of American schools, and what their reputation abroad before the organization of the National Association of Dental Faculties, as compared with the present condition. And yet it has done but a small proportion of its manifest duty. Its accomplishments have been elementary.

It is not too much to say that our professional reputation must be what our colleges make it. We are the educators of those who are to be the leaders in the professional matters of the future. The next generation of dentists will be what we shall make it. Legislators may pass laws to regulate and restrict dental practice, but the stream can rise no higher than the fountain-head, and

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\*Read by request before the National Association of Dental Faculties, Old Point Comfort, Va., July 31, 1897.

the practitioner of to-morrow must get his training and derive his professional knowledge from the school to-day. He must enter the profession by submitting himself to our guidance. The colleges are the fountain-head, and the stream will be limpid or foul according to whether we purify or contaminate it.

This should be a proud position. It certainly is a responsible one, and woe betide the college professor who does not realize his accountability. The man who accepts the honor which may appertain to this distinguished station, without striving his utmost to be in every way worthy of it, to fulfill every duty with an eye single to the best interests of student and profession, is unworthy a place in our ranks. He who assumes to arm the young men of our country for the battle of life, to fit them and equip them for an honorable career simply that he may minister to his own good, who takes the teacher's place and ascends the instructor's rostrum from selfish motives, is a worse hypocrite than the preacher whose every-day life belies his own sermons.

I believe that we are all sincere in desiring to make our schools, and through them the profession, all that they should be. To secure this it is not enough that we look solely to the preliminary qualifications of those whom we accept as candidates for a confidential position in American families. We need to make our instruction as perfect as possible. This cannot be done unless there is a generally accepted standard, and some uniformity in system. At present one of our greatest sources of weakness lies in the fact that there is no common comprehension of a standard of methods. One school begins instruction with the alphabet, proceeds to the construction of simple words, and by regular gradations to the building up of sentences. Another commences by an analysis of the sentence into its component words, and then studies the elementary symbols constituting the words.

That is, one teacher is synthetical, and the other strictly analytical. A student takes his first and second year in one school, and then circumstances or inclination cause him to finish his course at another. He commences under analytical teachers, and closes with a school that only arrives at the stage of analysis in the closing year. Hence, in reality that student never reaches the end of any regularly graded course. In this way the practical efficiency of that graduate can never be assured. Let me illustrate this by the various methods of arriving at a knowledge of that

basal study in all schools that attempt to teach the healing art—anatomy.

Some teachers open their course with an examination of the elements of which the human body is composed. That is, they begin with histology. They commence with the cell, and after having given a fair knowledge of that, they proceed to construct the cells into tissues, which are then considered. Then the tissues are built into organs, and finally the organs into the systems which they compose, and they do not arrive at a consideration of the human body as a whole until the last year.

Another pursues the opposite course. He begins with a study of the anatomy as a complete system. He considers its functions, and then goes on to study the organs whose actions make function, and finally to the ultimate elements of which organs and tissues are composed, and whose aberrant functions afford the pathological disturbances with which it is to be his life's work to battle.

The student who spends his first year in a school that begins with histology, and who goes to one that ends its course with tissue elements, never gets beyond elementary matters in his entire college training. This certainly will not tend to make the best practitioners, or to raise our profession to its highest point of efficiency. There should be a comprehension of the benefits of each method, a careful discussion of the merits of all systems of teaching, and an intelligent and discriminating adoption of that which is best. To this end I have accepted the invitation of the executive committee to bring this subject before you.

I am a believer in the analytical system. I think it is easier to arrive at an understanding by taking in pieces that which we do not construct, and thus get at a knowledge of the mysteries of that which we must attempt to repair. Let me give you my reasons for this faith, and then please allow me to listen while you show me wherein I am wrong, or confirm my prepossessions by your own corroborative testimony. Do not then understand me as speaking dogmatically when I propose the following methods in teaching anatomy, but only as offering suggestions.

Our sole reason for examining tissues and organs is that we may learn their action and function. Hence, we should begin with function. This requires that the preliminary examination should be of the system, and not of its organs. The study of anatomy, then, should commence with a general examination of

the body as a whole. In a dental school the first year should be devoted to general anatomy, beginning with osteology, or the frame-work. Then the viscera should be taken up, and their general morphology and function should be studied. This should be followed by myology, syndesmology, and neurology, that a fair idea of the whole body may be obtained. Practical anatomy should be commenced this term, and one extremity dissected. It has sometimes been urged that the student should not dissect until he has learned something of anatomy. This argument would be cogent if the object were to learn how to dissect. But we dissect to learn anatomy, and do not learn anatomy to discover how best to dissect.

All the study of this year should be general. Not a hint of any specialty should be given, and hence the teacher for this year is preferably a medical man. If he is a dentist, he is apt to introduce his specialty too early. The general study of the human body should be finished in the freshman year.

In the second, or junior year, the student begins to differentiate in his study. He should now take up regional anatomy. He has finished the study of the body as a whole. Not that he has learned all that he should, but he has devoted all the time that can be spared out of a three years' course, and he takes up the study of the part to which he is to devote his attention as a specialist. His field is bounded below by the clavicle, and he must have a special, definite, intimate knowledge of all above that.

As a part of this he commences the study of dental anatomy. The first step in this is comparative dental anatomy,—that is, the study of the dental organs as a whole, precisely as he began the first year in general anatomy. The dentist who learns nothing of the general relations of the teeth, and whose comprehension of them is only that they are organs out of which he is to pick his living, cannot claim any scientific knowledge. The teeth in all the different classes of animals should be generally studied, until the dentition of man is reached, when his teeth should be intimately studied in all their anatomical relations. The anatomy of the second or junior year is, as a whole, devoted to organs, as is that of the first year to systems.

No man can finish the anatomical studies necessary to dental practice in two years. He imperatively needs the third year, and this should be given up to careful examination and investigation

of tissues. In this year the microscope is a necessary adjunct. The student has now learned enough of function to comprehend how it modifies, or is modified, by structural development. In this third and finishing year he does not entirely confine his attention to histological anatomy, but he continues regional anatomy, because he is not yet sufficiently familiar with the organs, especially of the head. He also bestows considerable attention upon surgical, and morbid, or pathological anatomy. But his chief attention is given to structural, or histological anatomy, and he thus finishes his course by attention to the minutiae and detail for which he is unprepared during his first or second year, because he has not then the general knowledge to allow him fully to comprehend it, and because his mind usually is not sufficiently trained and disciplined to give him mastery over his attention.

The student who thus advances by regular gradations each year, separately taking up and mastering a definite branch or part of the subject, will be likely to retain his knowledge, because he has advanced toward it by a direct route, and because each division is made subsidiary to the next, and there is a regular gradation and progress.

If such a system, or if some other regular system, can be adopted in its general features by all of our schools, the grading of one who for any cause changes his college during his course will be greatly facilitated, and he will not be likely to miss any of the subdivisions. Our graduates will be better qualified for practice, and the tone of the profession will be elevated.

I would pursue the same general plan in the study of chemistry and physiology, the other basal studies of the theoretical curriculum. They should extend through the entire course, the last year in each to be devoted to special instruction adapted to an exclusive dental practice.

Materia medica should begin with the first year, but therapeutics cannot be profitably commenced until the student has obtained some knowledge of drugs, and hence it becomes a second and third-year study, materia medica extending over the first two years.

Embryology properly belongs to the second year, because its study demands an acquaintance with technical terms that are all unfamiliar at the outset, and because it is an intricate and involved matter which requires a disciplined attention. Aside from these,

there is no reason why it might not be begun with the freshman year.

Metallurgy is a second-year study, because its consideration demands a good acquaintance with general chemical laws, and these are acquired during the first year.

Surgery is a third-year study, because it demands not only a complete knowledge of anatomy, but a trained hand and absorbed attention as well. The student should begin the study of surgical pathology in the second year, and it may perhaps form a part of his general pathological studies.

Pathology should be differentiated from operative dentistry. They have very little in common, save that each may be curative. But operative dentistry is wholly mechanical and manipulative, while pathology should cover all medicinal and general treatment. Operative dentistry is largely prophylactic, while pathology is so to but a slight degree. Whatever has to do with the action of drugs, whether generally or topically applied, belongs to pathological practice. In the treatment of alveolar abscess, for instance, operative dentistry has very little part, its practice being confined to that which is mechanical, or that which is done with instruments. I believe that in the past we have not sufficiently distinguished between the two. A sharp line of demarkation should be drawn between that which is mechanical and that which is therapeutical.

It will be seen that I have not attempted to assign any place to the practical part of dentistry. My subject was the teaching of anatomy, but I have thought it not inappropriate to suggest some thought concerning other didactic studies.

Let me repeat that I have only considered the matter tentatively, and realize as fully as any of you that there is room for much consideration and extended discussion before the various studies in our curriculum shall each have been definitely assigned its appropriate place.

## ALL SORTS.

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### Impressions of Modelling Compound.

Dr. W. E. Robertson suggests the following method for perfecting impressions of modelling compound :

Secure the impression in the ordinary manner, and after removal from the mouth, and when it has become quite hard, trim off any surplus until it corresponds to the shape of the rubber plate or base to be constructed. Then hold the inner surface of the modified impression over the flame of a spirit lamp, or Bunsen burner, until the surface of the impression only is softened, but not the main body of the impression. Then return the impression while it is warm to the mouth, and after firmly pressing it home, allow it to harden before removing it.

Dr. Robertson claims that such a method will give more satisfactory results than the ordinary manipulation of modelling compound.—*Amer. Journal.*

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### Tooth Discoloration from Arsenical Preparations.

Sometimes after an application of arsenic, the patient returns, and though less than twenty-four hours may have passed, the tooth shows unmistakable signs of discoloration. First we may ask how this is to be explained? Arsenic is a most powerful constringent, and when applied to a pulp, in which the capillaries are engorged, it is conceivable that this violent constriction causes an actual rupture of the small blood vessels, so that the blood is emptied against the walls of the pulp canal, and passes into the tubuli of the dentine, producing the pink or brown color, observable when the discoloration originates in this manner.

In a recent case of this sort the pulp was removed, fortunately without tearing, and the copious hemorrhage which followed was finally arrested with hot water. The dam, of course, was in position, and canal was packed with cotton saturated with caustic pyrozone (25 per cent. sol.) and covered carefully with hard gutta percha. This was left for twenty-four hours, at the end of which period the tooth was absolutely restored to normal color, and was therefore promptly filled, no subsequent discoloration having thus far occurred. The success of this bleaching, depended upon the prompt application of the discolorizing agent, before the blood, which had entered the tubuli by extravasation had become coagulated. An important moral, which may be deduced from this lesson, is

to the effect that when treating anterior teeth with arsenic, especially where the capillaries are probably engorged, the arsenical dressing should not be allowed to remain in place for more than one day, if so long.—*Extract from Ed. Items of Interest.*

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### Small Helps in Practice.

I have found it a very useful plan to soak a large piece of cotton wool thoroughly in chloro-percha solution, then with a gentle, steady heat evaporate the chloroform, and cut up the remaining hard mass into pieces of various sizes, they are then always ready for use as temporary dressings. When required for use the pellets are warmed over the spirit lamp so as to soften them, and then packed into the cavity; if required extra soft, as for instance when used to cover an arsenical dressing, they should be well heated, and then dipped into chloroform. I find these pellets also very useful for firmly wedging thin steel or German silver matrices against the walls and cervical edges of approximal cavities. In place of the Denham rubber cups I have been using small rounds of rubber dam and have found them very serviceable in all cases where the rubber cups were applicable. Of course, I do not advocate their use in long operations, such as large contour gold fillings, but for operations of medium length they are very useful. They can be retained in position on the teeth, either by the clamp, or by tying with silk. The latter plan is I think preferable where possible, and, in the case of the lower teeth, the saliva ejector tube on the lingual side of the teeth, and a bibulous paper pad on the outside, under the rubber, will sufficiently evert the edges to give it a cup-like form. In the upper teeth, the tendency will, of course, be for the rubber to be pendent. Should the operator be called away in the middle of an operation, the teeth can always be kept perfectly dry by folding the edges of the rubber over the tops of the teeth, placing a tightly folded piece of bibulous paper over the rubber, and getting the patient to keep the mouth shut on the bibulous paper until the operator's return.

Another use I have put the rubber dam to is cutting out India rubber bands for regulating and other purposes. It is annoying to want some bands in a hurry, and find there is not one fit to use; but, by means of steel punches of different sizes, obtainable from any leather shop, Nos. 6, 8, 9, 11, 13 and 15, I find the most useful sizes, and a flat leaden block, a fresh supply can at a moment's notice be punched out in the workroom either from thick or thin rubber dam, just as one wants either strong or weak bands. I have tried cutting small bands from

narrow rubber tubing, but did not find them so satisfactory as those punched from rubber dam.

In cases of pain during the eruption of a wisdom tooth I have found rapid relief follow the treatment of the gum with crystals of carbolic acid, dipping small pieces of cotton wool in the melted crystals and a little cocaine, and then packing them between the erupting tooth and the gum, and also touching the surface of the gum with the carbolic acid and cocaine. The patient can himself carry on the same treatment at home by touching the gum three or four or more times daily with a small piece of cotton wool twisted round the point of some fine instrument and dipped in a solution of carbolic crystals and cocaine dissolved in alcohol; this treatment is, I think, better than lancing or excising the gum over the coming tooth, as in lancing the gum a cicatrix is apt to form, rendering a second attack much more troublesome; and in excising, with the gum so exquisitely sensitive as it very often is, the operation is apt to be rather unpleasantly painful for the patient.—A. T. COUCHER, *Jour. Brit. Asso.*

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### Functions of Mucous Membranes.

In an instructive article on the general and special features of the anatomy and histology of mucous membranes, Dr. T. H. Manley, in the *Med. and Surg. Reporter*, says:

“1. The mucous membranes and their epithelial prolongations serve as a protective mantle to the less highly vitalized elements beneath.

2. Most of them possess the dual property of taking up and discharging various substances. With their glandular equipments in the mucosa, they occupy a leading position in all the vital and chemical changes of the body; in tissue metabolism, degenerative and regenerative processes, their place is a dominant one.

3. In the healthy state of the system they provide formidable barriers against germ invasion or against the introduction into the system of putrescent noxious elements. With their serried, close columns of epithelial cells, they resist the ingress of, or, at all events, neutralize or destroy in a large measure, lethal elements in the atmosphere and in the food we consume.

4. The regenerative power of the mucous membrane and its epithelia is most extraordinary. This is commonly noted in the parts most exposed to trauma, and the action of chemical irritants, as in the mouth, the respiratory passages, the stomach, the rectum, the urinary and the gall bladder. In the genital organs of a woman it is most remarkable.

5. Neither the urinary nor the gall bladder have any mucous

glands. Repeated experiments have quite conclusively demonstrated that the normal urinary bladder possesses no absorbing power; none to poisons in solutions, except the corrosive irritants. It is probable that the colon absorbs very little or none of its own contents, and it still remains a much-disputed question whether or not the rectum and sigmoid flexure can absorb and assimilate non-digested proteids, or carbohydrates.

6. The mucous membranes in most situations constantly shed the worn-out surface epithelium."

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### A Preventative for Grating the Teeth.

Dr. Allen spoke of the different ways in which certain points might be utilized, among them making removable bridges. We had a case in our office a short time ago of a lady who grated her teeth very much at night—so much so that she was wearing down the incisors very rapidly. The teeth had been filled on the approximal surfaces, and she would break the corners of the incisor teeth. We made gold caps fitting over the bicuspids and molars, and instead of making a large plate, united them with the stiff bar across, utilizing that part of the system. She wore it at night, and it left the incisors free. It is perfectly rigid and firm, although it has been worn some time.—*Items of Interest.*

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### Crown and Bridge-Work.

. . . . The principal elements entering into a successful operation are, first, a healthy condition of the mouth and teeth or roots to be used as abutments; second, their proper preparation to receive the attachments; third, accurate fitting of caps and bands; and, fourth, perfect articulation. Any one of these conditions ignored, failure may ensue. . . .

Before advising the placing of a bridge, care should be taken to see that the teeth are in good condition and sufficiently strong to do the work imposed. Too much strain should not be placed on a single tooth or root. Ordinarily two good roots will support a bridge of three or four teeth, and I have seen satisfactory cases of even five that have been in for a number of years, but that is rather more than is generally advisable. I am speaking now more particularly of permanent fixtures. It is perfectly safe to put a full denture on the two bicuspids and the two first or second molars. A piece of this kind is very strong, as there is little lateral motion, and each side helps to support the other. A cuspid and first molar and very often the second molar will form safe anchorages. The

two centrals will carry the two laterals and the laterals the centrals. Frequently the two canines may serve to carry the four incisors if they stand well apart, and the teeth may be placed nearly in a straight line, but if the arch is narrow and very much curved the leverage would be so great as to eventually loosen the abutments.

In the preparation of the teeth and roots the greatest care should be used; for if not properly done the chances are against the work proving satisfactory. While the trimming of the teeth seems like a simple operation, it is by no means easy. The operator should always have in mind what the shape of the tooth would be if it were cut across just below the gum line. The swell should be entirely taken off to about one-sixteenth of an inch below, leaving the sides parallel, or slightly larger at that point, so that when the band is passed over it will hug the neck tightly. If the tooth is larger near the cusp than below the gum, the band, when put on, instead of passing between the tooth and gum cuts into the gum, and when cemented the cement will present a rough, jagged surface which will be a constant source of irritation. An explorer should be used constantly, and trimming should continue as long as the least particle of enamel or the least ridge can be felt. In all of the teeth the bulk of the trimming will be on the mesial and distal surfaces, the swell being greater at those points.

Looking down on a lower molar after it has been shaped, it will be seen to be nearly square, with the corners rounded, being slightly wider at the mesial than at the distal side, owing to the anterior root being larger. The upper molars will be somewhat triangular, being broader on the buccal side because of the two buccal roots being larger than the palatal. Occasionally this may vary, but not often. In the bicuspids, cuspids, and laterals, the roots are egg-shaped, with the base towards the labial side, the bicuspid being long and narrow.

The shape of the centrals is always nearly a perfect triangle with rounded corners.

In any of the anterior teeth, if the enamel be entirely removed, the root will be of the proper shape to receive the band, as the greatest circumference of the body of the tooth is at the junction of the enamel with the dentine.

In opening a canal in such a tooth, it will be found that if its direction be not changed the pin will come wholly or partly under the facing, which necessitates the grinding away of the pin so as to leave it attached only to the thin floor of the cap, or grinding the facing. If in enlarging the canal the reamer be pressed towards the palatal side of the root, thus sloping the canal in that direction, and then, by bending the pin slightly, plenty of room will be left in front of it for the facing. The pin, too,

should be long and heavy enough to support the crown. Very frequently a patient presents to have a crown reset, perhaps a large cuspid or central, having a pin not more than three-sixteenths or one-fourth of an inch in length and of No. 16 or 17 wire, where No. 13 or 14 of three-eights or one-half inch in length could have been used. In opening the canal, the length should first be ascertained by passing a fine broach through the apical foramen, the pin then being made long enough and large enough to give all the strength required. In looking after details like these much time may be saved and success assured.—DR. PESSO, *International*.

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### Hints on Cataphoresis.

Take a piece of insulated copper wire, No. 18 or 20, remove insulation from each end, take one end of the wire, wrap around the small end of an excavator a sufficient number of times to form a cone, and into this insert the plug of positive pole. Select suitable clamp for the adjoining tooth. Around this clamp wrap the insulated portion of the wire, place in position, and bend the free end of the wire so that it will enter the cavity and act as the electrode. This removes the necessity of holding the mouth electrode with the hand, and is less liable to break the contact.

To insulate a filling in adjoining tooth from the action of the current, slip a piece of mica down between the teeth.

To prevent leakage at the gum margin, warm gutta percha and crowd it down between the necks of the teeth.

An ever-ready mode of applying the obtundent is to make the electrode out of a long glass drop tube. Remove the rubber nipple, insert into the small end a cotton wick, and into the long end fix a rubber cork. Through the cork insert a wire full length of the tube. Into the tube place the obtundent. The end of the wick will be found always moist, and no overflow. To prevent evaporation when not in use cover small end of the tube with rubber nipple.—D. B. McHENRY, *Items*.

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### How to Increase the Strength of Cross-Pin Teeth.

It is quite frequent that one would like to increase the strength of a crosspin tooth in some way rather than to show so much gold over cutting edge of tooth, which is nearly always disliked by both patient and operator; and in doing this we so often meet with cracking the porcelain. Crosspin teeth generally work in better in a majority of cases, but they are much more liable to break and cause us no little trouble in

repairing them. Now, the weak point is across the tooth where the pins are, and 'tis here you want an increase of tooth body, and in most teeth we buy they are thinner here than elsewhere, and the presence of the pin adds to their weakness. To increase the strength of such a tooth simply take any light color, low fusing porcelain body you may have and bake same on back of tooth until you have it very much oval in shape, leaving the mere points of pins exposed, providing the case you are working will permit of this much fullness. The longer the pins are the heavier you may make the porcelain backing. To back up such a tooth with gold is better done by swaging, and a swaged backing always fits better in any case. After you have fused your porcelain nicely over back of facing, take the tooth and press it into moldine to make a die. The tooth must be lifted out with care lest you spoil your impression; and to do this apply a drop of hot sticky wax on tooth and touch a wood point into it and hold until cool, then you can lift straight out without spoiling any edges. It is important to punch the holes in your backing just where they should be at the same time you swage, and to do this take two short pieces of steel wire about same size of pins in tooth and place them in impression where they are indicated by imprint of other pins and leave them. You are now ready to pour your metal for die. After getting die, trim pins down just short enough to have them puncture the gold through, then swage your backing, using 22 karat gold, about 30 to 32 guage. This method increases the strength of your tooth in two ways: First, by an increased amount of tooth body, and second, the oval-shaped backing relieves the strain at what would otherwise be the weak point, across the pin.—R. D. GRIFFIS, *Tex. Dental Journal.*

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### How to Make Thin Hard Disks.

The thin, hard disks mentioned will be kept at the dental depots, or a number can be easily made in a very few minutes by the dentist himself. Put an ordinary felt wheel on the screw-chuck of the lathe, and with a thin, sharp knife cut while the lathe is running rapidly, starting near the edge and gradually increasing the thickness to one-eighth or three-sixteenths of an inch at the centre. Three or four can be made from an ordinary felt wheel. They are then dipped in white shellac varnish and dried on a piece of glass or board. When thoroughly dried put on the chuck again, and while it is running apply a little heat, at the same time pressing the side with a small stick or a tooth-brush handle. In this way they can be made of any shape desired. When they are cool hold a coarse vulcanite file to the edge of the running disk and bring it to a sharp edge.—DR. PESSO, *International.*

### Bridge-Work Without Crowns.

I have been troubled, as I suppose all of you have where, by the loss of some of the bicuspids or molars on either side of the lower jaw, the anterior teeth wear away the upper incisors on their palatal surfaces, and many times we find the pulps of the upper incisors being encroached on by wear. It was in such cases that I have adopted a method which has given me a great deal of satisfaction. I have not seen it practised by any one else, and will try to illustrate it as well as I can. The bicuspids and molars are built up sufficiently to open the bite by pieces of pure gold burnished on to the grinding surfaces, with two or three pins fitting into holes drilled into the teeth, and the occlusion made correct by pieces of plate and solder melted on. Dummy crowns are then fitted between the teeth which have been tipped and soldered to the tips, making a continuous bridge. The tips are then set with cement. The palatal surfaces of the incisors may then be restored.—DR. DRAPER, *International*.

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### Restoration of Bicuspids.

One of the most common accidents which dentists are called upon to repair is the superior bicuspid from which either the buccal or palatal face has broken, often to the gum line, carrying away frequently both approximal fillings. Such teeth are usually pulpless, and the remaining portions of the crown can be retained, and the contour restored either with amalgam or with a combination of amalgam and porcelain as follows:

If the buccal wall is still standing, a strong metal pin should be cemented into the root and left nearly as long as the finished palatal portion is designed to be. All soft and frail edges having been cut away, a temporary band matrix, similar to those shown, is selected of a size suitable to represent the size of the proper contour of the finished tooth, and is put in place outside of and around the broken crown and the pin, care being taken to fit the matrix accurately to the gum line above the break.

The ring matrix is then filled carefully and solidly with amalgam, the first pieces quite plastic, to enter all inequalities about the pin and broken tooth, but hard and dry amalgam should be used when the operation nears completion. The ring should be left on the tooth for at least six hours to support the amalgam until fully hard, when it should be removed and the amalgam shaped and polished.

Should the buccal wall instead of the palatine be broken off, a cross pin porcelain facing of the proper size and color should be selected and

ground to fit the buccal aspect of the tooth just under the edge of the gum. The pins of the porcelain are now fitted into a narrow scrap of platinum, or gold and platinum, and soldered with eighteen carat solder. This cross-piece of metal is attached to the pins near the ends at a sufficient distance from the facing to allow a screw to pass through the square opening thus made. The screw is then cemented into the root, the porcelain placed in its proper position with its joined pins encircling the screw, and a temporary band matrix of proper size is used to surround the various parts of this combination.

Enumerating these parts from without inward, there are the steel band, the porcelain facing, the screw, the palatal wall of the natural tooth, and again the steel matrix. Amalgam is then packed into the matrix and all about the pins of the porcelain, the screw which is secured far up in the root, and into the inequalitiee of the palatal wall of the tooth.

When the matrix is removed the next day and the amalgam finiihed, the result is most pleasing.—DR. E. L. DAVENPORT in *International*.

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### Action of Chloroform.

The primary action of the chloroform is to depress the blood-pressure chiefly by its vaso-motor effect, secondly by its cardiac effect, and finally that while the drug does exercise a depressant effect on the respiratory centre, the failure of this centre is chiefly due to anemia. As, however, an intact respiratory centre means regular breathing, we watch this function to determine the dose of chloroform actually inhaled, and because any variation in this function, as shown in irregular breathing, means that the chloroform is disordering arterial tension. Death from chloroform, then, is usually a vaso-motor death, for an intact arterial system is as important to vital function as an intact cardiac apparatus.—H. A. HARE, *Therapeutic Gazette*.

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### A Combination Crown.

There is one crown that I have used quite a little which gives the strength of the banded crown, and at the same time gives all the advantages, as regards appearance, of the porcelain crown, and that is made by using a combination of the band and the English tube tooth. It is made as follows:

Use a band as usual; cut it off at gum line; solder on a piece of 27 gauge clasp metal. Grind Ash tube crown to place. Mark place on cap

where hole in crown comes ; drill hole size of tube wire, pass wire through crown and into root as far as it will go. Cut wire a little longer than needed ; remove cap and porcelain crown. With wire hold cap and porcelain in contact. With wire in position, press Melotte's moldine into root end of cap and around pin and over edge of band. Use small amount of moldine, press upon asbestos board, so it will stay upright while soldering. Remove porcelain crown and put Parr's flux and solder around pin and heat up at once and solder. The moldine will hold the parts firmly in place, and the work can be done in a few moments, no delay for heating. Put the crown and cap together and hold firmly in contact. Heat in flame and flow sulphur around post and between porcelain and band. Set on root as usual.—DR. COOK in *International*.

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### Hardening Steel.

Metallurgists now think they know why a piece of red-hot tool steel becomes flint hard when suddenly quenched in water. For years they have been satisfied with the explanation that the shock drove the molecules of the steel into closer contact, hence the hardness, but this theory was completely destroyed by the fact that the volume of the hardened steel was greater than that of the unhardened material. After five years' search the metallurgical department of the Sheffield Technical School has solved substantially this difficult problem. It had been necessary to employ very intricate physical apparatus, the object of which was to measure accurately what seemed a paradox, namely, how much hotter a piece of steel became on cooling, and how much cooler it became on heating. These phenomena were due to the formation or dissociation of compounds within the steel itself. The result of the researches showed, almost beyond doubt, that the almost diamond hardness of quenched steel was due to the presence of a remarkable sub-carbide of iron, and that the action of tempering was due to the fact that far below red heat this compound decomposed and diluted the mass with soft iron. The permanent magnetism of steel depended on the amount present of this compound.—*Engineering Mechanics*.

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### Aconite for Swollen Faces.

In my practice I use the root tincture of aconite with good results on faces swollen from abscess, removing the stain with a wet napkin. Last February I was called by a physician to see his little daughter, a child of 10 years, who was suffering with abscess of the first left inferior

molar. The whole family had been up two days and nights with her and her head was wrapped in a shawl, as the air hurt her face. I prescribee the topical application of tr. of aconite and plenty of it, and the removal of all wraps from her head. In two hours the child was easy and went to sleep, and her father said he had learned something. Thinking that others might profit by these experiences is my excuse for writing this.—T. A. DAVIS, *Dental Digest*.

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### Method of Forming a Relief for Hard Places in the Mouth.

Outline on the cast with pencil the location of the hard places, and cover them with No. 60 tinfoil. In an ordinary case, with a hard ridge down the center, I use about five thicknesses—less if the soft parts are not very soft, and more if they are extremely soft. In the latter case, I let three thicknesses extend to and beyond the posterior margin of the plate, the other pieces stopping one-fourth inch back from the edge. To do away with an abrupt edge, (one of the objectionable features of the old air chamber), each layer is made of a different size, the largest piece is cut first, the second of the same size, and reduced by trimming off the edges, and so on. The smallest piece is applied first to the cast, and the others successively, so that the steps are not perceptible, the tinfoil being secured to the cast by varnish, unless the vulcanized base-plate is made by West's method, in which case the rubber cement is all that is necessary.—W. E. WALKER, *Texas Dental Journal*.

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### Purified Water for Hypodermic Solutions.

The subject of pure and sterile water for the preparation of hypodermic solutions and solutions of alkaloids to be kept free from fungoid growths has interested me for many years. The methods of others have been employed, but I find none as satisfactory as water from which all organic matter has been removed by oxidation and precipitation. This I accomplish as follows :

Take of boiled hydrant water 1 gallon, to which add  $\frac{1}{8}$  grain potassium permanganate which has been dissolved in 1 ounce of water ; mix well, allow to stand 1 hour, and if the water loses the light pink color add another portion of potassium permanganate, and in this manner continue until it retains a delicate tint from the salt.

Then add 5 grains of alum, shake until dissolved, and allow to stand until the precipitate subsides and until the tint from the permanganate has disappeared. The process is hastened by frequent shaking.

Filter three times through a double thickness of white filter paper which has previously been scalded to render it sterile.

The process should be conducted in well closed glass containers, and during filtration the funnels should be covered with well-fitting rubber covers of the kind known as "sanitary covers."

The finished product should be kept in absolutely clean, well stoppered bottles, and before using the lip of the bottle should be carefully freed from dust and every care should be exercised to keep it clean and sterile. For many years we have used no other water in the preparation of hypodermic solutions, many of which we have kept in a clean, sterile condition for about six months. Hypodermic abscesses are unknown where proper attention has been given the syringe.

I advise its use as superior to distilled water whenever a pure sterile product is required.—S. RAUSCHENBERG, in *Amer. Druggist*.

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### Danger from Air Injection.

As for ordinary hypodermic medication, or serum administration, the writer believes the danger from air injection is absolutely *nil*. In using the Koch syringe for giving small measured quantities of serum, toxins, etc., it is customary, in order to be sure that the entire amount of fluid is injected, to allow one or more small bubbles of air to escape from the needle. During the past six years he has made literally many thousands of such injections into rabbits, guinea pigs, rats, and mice, and he has yet to see any harm come from it.—DR. MCCLINTOCK, in *Jour. Amer. Med. So.*

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### Some Peculiarities of the Jaws.

There is in 95 per cent. of mouths more depression in the region of the left bicuspid than the right. The process is shorter on the left side than on the right, so that if the anterior teeth are arranged close to the gum they will be too short on the left when placed in the mouth.

In a majority of mouths the teeth on the left side of the lower jaw in the region of the cuspids are higher and more prominent than on the right. The left side of the lower jaw recedes farther from the median line than on the right.

Strange to say, I have found but few dentists who have observed these peculiarities. Who can tell the cause? I have a theory and so has Dr. Talbot, but would like the opinion of others.—L. P. HASKELL, *Dominion Journal*.

### Tuberculosis of the Alveolar Process.

Carl Zandy (*Arch. f. klin. Chir.*,) states that he was able to collect 37 cases of Tuberculosis of the Alveolar Process from the literature of the last 25 years. He also gives the history of a patient observed at the clinic of Bonn. The teeth are of the greatest importance in the etiology of this condition. Carious teeth are the seat of entrance for tubercle bacilli. Wounds of the alveolar process, especially those caused by extraction, are of grave importance. Whether the bacilli come from a phthisical lung or from the outer world, they need no better soil for development than the alveolar cavity left after extraction. There is no seat of predilection in this disease, and any part of the alveolar process may be affected. As a rule, other parts of the buccal mucosa are involved at the same time. It is very likely that the pulmonary lesion within is found at the autopsy is secondary to the alveolar disease. Syphilis is no bar to a tubercular involvement of the alveolar process. The disease seems to develop between the ages of 15 and 50. Males are more frequently affected than females. Usually the gum will swell and become loose, soft, and bleed very rapidly. This will soon be followed by ulceration, with pale, sluggish granulations. Following this the teeth will get loose and fall out and the bone may become necrotic. Pain is not very marked, but salivation is very profuse and the mouth has a very foul odour. A differential diagnosis is to be made from syphilis and carcinoma. The diagnosis will be facilitated by the presence of tuberculosis of the larynx or lungs. The best therapeutic measure is through curetting and removal of all suspicious tissues. This can be followed by applications of equal parts of lactic acid and distilled water to all recurring foci.—*Dental Record*.

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### BRIEFS.

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**Cocoa-Butter as a Lubricant.**—Cocoa-butter is preferable to oil for lubricating disks and polishing strips.—*Pac. Journal*.

**Gutta-percha** used for filling is easily spoiled by keeping it in too warm a place. If kept in a solution of table salt it will keep for years.—*Dom. Journal*.

**A Cement for Fastening Handles and Ferrules.**—Equal parts of rosin and brick dust make a good cement for fastening handles and ferrules.—*Pac. Journal*.

**Eka-Iodoform** is an iodoform-like preparation, in which paraform is used. It has been placed on the market in Germany as a powerful non-irritating bactericide.—*Amer. Druggist.*

**In Regulating Teeth** the precaution should be observed not to use too much pressure; it may cause the death of the pulp, or produce a case of acute apical pericementitis.—*Dental News.*

**Electric Resistance of Platinum.**—According to experiments recently conducted by Messrs. Holborn and Wien, the electric resistance of platinum theoretically sinks to 0 at  $-258^{\circ}$  Centigrade.—*L'Industrie Electrique.*

**Rapid Separation of Teeth.**—Much injury is sometimes done by hasty separation of the teeth. If they cannot be brought apart by a separator, go slow, that you may not produce looseness and inflammation.—*Welch's Monthly.*

**Removal of Blood-Stains.**—A teaspoonful of tartaric acid in a basin of warm water is recommended for rinsing hands, napkins, instruments, etc., for removing blood-stains. They should be rinsed afterwards in plain water.—*Record.*

**Treatment of General Septicemia.**—The treatment of general septicemia is by hypodermic injections of creosote. The creosote is mixed with equal parts of camphorated oil, and 20 minims of the solution are injected three times a day.

**To Adjust the Ligature** around the tooth when the rubber-dam is applied, a narrow foot-plugger makes an excellent carrier; the serrations of the plugger prevent the slipping of the ligature while being carried to place.—*Dental News.*

**Soft Rubber for Lining Dentures.**—After trimming the rubber with a hot knife there is a certain amount of stickiness about it, which can be removed by rubbing over the rubber with a clean, soft rag dipped in paraffin oil.—*H. W. Moore, Ash's Quarterly.*

**To Make a Smooth Cast.**—Powdered tin mixed with collodion to the consistency of thick molasses, and applied to the surface of a dried cast before packing with rubber, makes the inner surface of a plate smooth and hard as if vulcanized upon metal.—*Pac. Journal.*

**Oxalic Acid for Bleaching.**—A strong solution of oxalic acid introduced into a cavity and the use of a hot-air syringe will bleach a tooth as quickly as any other agent. To take away the effect of the acid I use carbonate of potassium afterwards.—*Dr. Lichel, Stom. Gazette.*

**The Cause of Blistering of Rubber Plates after Revulcan-**

**ization.**—This was proved by a simple experiment to be due to bubbles of air remaining between the investing plaster and the surface of the old vulcanite, and the remedy is more careful investment.—*Jour. Brit. Association.*

**Treatment Not Creditable.**—The way that pyorrhea alveolaris is generally treated, both surgically and medicinally, is not creditable. Not recognized early enough; not thoroughly treated surgically; and little or no medical treatment. How a cure can be hoped for is a mystery we cannot solve.—*Dental Review.*

**Use Good Burs.**—It is poor economy to use old or poor burs. We know an excellent operator who lost half his practice in this way. Both he and his patients suffered for it. One of the wisest investments in the operating room, is a good dental engine run by a motor, and a full equipment for the front and back action.—*Dom. Dental Journal.*

**To Prevent Nausea from Use of Rubber Dam.**—In *Welch's Monthly* Dr. Carmichael says: “Use oil-silk under the rubber dam.”—C. C. Jones, “Treatment by a reputable Christian scientist.”—Dr. Wetherbee, “Substitute cottonoid.”—Dr. Naumann, “Put perfume on the dam.”—Dr. Grove, “Wash the dam thoroughly in rose-water.”

**Relation of Anesthetics and Body Temperature.**—Schleich holds that anesthetics are more dangerous the more their boiling point differ from the temperature of the body. He has devised an anesthetic (chloroform and petroleum ether) whose boiling point is the same as the temperature of the body, and has obtained excellent results, all disagreeable sequelæ being absent.

**For Cementing on Bands and Crowns,** dry the tooth and paint with shellac varnish before applying the cement. This will be found to give durable adhesion. Should the cement dissolve, the shellac will still protect the tooth and there will be no decay under the band. To retain regulating appliances, add a very little powdered pumice to the varnish.—*W. G. Lange, in Cosmos.*

**Black Rubber for Dentures.**—I prefer to make my plates of black rubber with pink rubber gums. On account of a less quantity of earthy substances and coloring matter in the black rubber, there is less inflammation of the mucous membrane, besides being cleaner in the mouth than red rubber or celluloid. It also, I think, makes a much stronger plate.—*H. Pirtle, Items of Interest.*

**To Sterilize Rubber Tubing.**—Use dry heat; raise temperature gradually to 149° C. (284° F.). If the tubing is attached to any instrument and cannot easily be detached, after the dry heat process, place in

pulverized talc, previously sterilized. Avoid using the rubber-bulb syringe, as some do for cleansing abscesses. This syringe may be made a positively filthy and dangerous instrument.—*Dom. Journal*.

**To Fasten Metal to Glass.**—A very satisfactory cement for this purpose can be made as follows:

Resin	3 parts.
Soda	1 "
Water	5 "

Boil until a soap is formed, and to 50 parts of this soap add slowly and with constant stirring 100 parts of levigated plaster of Paris.—*Amer. Druggist*.

**Antiseptic Wax.**—This preparation consists of beeswax, seven parts; almond oil, one part; and salicylic acid, one part. Professor Keen introduced this preparation into Jefferson Hospital several years ago, and uses it extensively to arrest bleeding from the bone during operation. After removal of a growth from the jaw, as an exostosis or an epulis, the bleeding can be controlled by this application. The wax is of great service in bleeding from diploe or cancellous bone.—*Med. Record*.

**A Matter of Business.**—System and order in the business end of the profession is by no means incompatible with scientific study. Mail each and every one of your patrons a statement of account the first of every month. Give them a chance to be honest and self-respecting. If any take offense at your assuming they possess these desirable qualities, you are better off without their patronage. There are too many people in the world who fancy they are doing you a favor when they pay you for your work.—*Med. Brief*.

**Japanese Bibulous Paper Napkins.**—Mr. Dall, of Glasgow, writes: "I send you a few Japanese bibulous paper napkins, such as I give to my patients for use while applying nitrate of silver in treating sensitive dentine and arresting superficial decay. Linen napkins become very much stained and are rendered useless by the nitrate of silver. My patients like the paper napkins very much. I find them invaluable, and it gives me pleasure to bring them to the notice of the profession for this special purpose.—*Ash's Quarterly*.

**Adhesol** is a substitute for collodion, over which it has the advantage of being a better antiseptic. This preparation is a clear amber-colored liquid, with a pleasant odor, and is neither toxic nor caustic. It dries in a few seconds on the skin, and is an adherent covering to the mucous membrane. It is prepared as follows: Macerate, Resina

Kopæ, 350 gm.; Benzoe and Balsam Tulu aa, 30 gm., with a mixture of Ether, 1000 gm.; Ol Thymi, 20 gm. for two days, filter and add a Naphthol, 3 gm.—*Dom. Journal*.

**Sulphur for Mounting Carborundum Wheels.**—Powdered sulphur, such as is generally used for fitting tube teeth in position, is superior to shellac for mounting carborundum wheels on lathe chucks.

To mount a wheel, heat it and the chuck over a Bunsen flame; put sulphur in the hole of the wheel, fit the chuck on the lathe head, true the wheel while the chuck is warm, secure the wheel in position by tightening the nut against it, hasten the setting of the sulphur by pouring cold water over the wheel and chuck, and the result will be perfect fixture of the wheel on the chuck.—*Ash's Quarterly*.

**Diamond Drills, How to Use.**—In using a diamond drill for making cavities in artificial teeth, it is most important to bear in mind that the point should be dipped in sweet oil or water, *and placed on the work before the engine is started*. The engine should be stopped as often as the drill shows signs of becoming dry, and each time after it has been dipped in the lubricant it must again be placed on the work before the engine is started. It is, perhaps, needless to add that the handpiece must be held firmly and steadily in position to ensure success and to avoid breaking the drill.—*Ash's Quarterly*.

**An Effective Instrument.**—By breaking off most of that portion of a Donaldson Cleanser above the barbs, and fastening upon it a drop of tinner's solder, a very effective instrument is made for use in the anterior roots of inferior and buccal roots of superior molars. It is used in the thumb and finger with sulphuric or lactic acid for entering obscure roots, and for the removal of cotton dressings where they are so situated that the slight twist necessary to engage the fibers cannot be made with a broach in a handle on account of the curve necessary to reach roots well back in the mouth.—*Pac. Journal*.

**Interesting Notes.**—Fifty-one metals are now known to exist; four hundred years ago only seven were known.

There are 165 distinct colors in the spectrum, and 650 different shades have been detected.

A powerful anesthetic, which volatilises on exposure to the air, has been invented by a Polish chemist. It is believed that bombs filled with this chemical, and thrown into the ranks of an opposing army, will in a few moments make the foe utterly helpless.

It is stated that the right hand, which is more sensitive to the touch than the left, is less sensitive than the latter to the effect of heat or cold.

**New Publications.**

A MANUAL OF THE INJURIES AND SURGICAL DISEASES OF THE FACE, MOUTH, AND JAWS. By John Sayre Marshall, M.D., (Syracuse Univ.), Former Professor of Dental Pathology and Oral Surgery, and Emeritus Professor of Oral Surgery of the Dental Department of Northwestern University. Former Professor of Oral Surgery in the American College of Dental Surgery. Attending Oral Surgeon to St. Luke's Hospital, Mercy Hospital, and Baptist Hospital of Chicago. Fellow of the American Academy of Dental Science. Member of the American Dental Association, and of the State Dental Society of Illinois. Member of the American Medical Association, and of the Cook County Medical Society. Philadelphia: The S. S. White Dental Mfg. Co., Publishers, 1897. Price, cloth, \$6.00; sheep \$7.00.

It requires a special gift to write a useful text-book and we do not hesitate to say that such a gift has been abundantly bestowed upon Dr. J. S. Marshall, author of the book before us. The work is an ideal one. The author realizing the necessity for progressive teaching in colleges, has taken up this subject progressively and while he treats the various topics at length, he has eliminated superfluous words, leaving well condensed information for the student.

The plan of the book is the outcome of the author's many years of experience as a teacher of oral surgery. The subjects have been divided into short chapters, suitable to class recitation work, and each chapter is followed by a series of review questions covering the most important facts presented upon each topic.

Unlike other text-books on this subject, the author begins the treatise with a careful and comprehensive study of surgical bacteriology. The germ theory of disease is taken up, then follows a description of many bacteria encountered in oral surgery, fully illustrated with micro-photographs of these micro-organisms. This subject together with those of inflammation, septicemia, pyemia, etc., covers about 150 pages. The subject of shock and collapse is next carefully considered, then instruments and accessories for operation are described. The remainder of the book treats of diseased conditions of the face, mouth, and jaws that call for surgical interference and describes the methods of operating and medication.

The book contains 716 pages and is a work that no dentist can afford to be without. The typography, printing and binding are excellent.

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ANATOMY, DESCRIPTIVE AND SURGICAL. By Henry Gray, F.R.S., Lecturer on Anatomy at St. George's Hospital, London. New and thoroughly revised American Edition, much enlarged in text and engravings, both in colors and in black. In one imperial volume of 1239 pages, with 772 large and elaborate engravings. Price with illustrations in colors, cloth \$7.00; leather \$8.00. In black, cloth \$6.00; leather \$7.00. Lea Brothers & Co., Philadelphia and New York.

For years Gray's Anatomy has been the standard text book and there seems to be no reason why it should not continue to have this honor. With each new edition valuable material is added, thus keeping it up thoroughly with the times. For the present edition the section on the mouth and teeth has been re-written by an eminent authority on dental anatomy and the result is a most satisfactory presentation of the latest advances in this highly specialized subject. It therefore provides the dental student with all the assistance a text-book can furnish, and likewise forms an admirable work of reference for the active practitioner.

Many new engravings have been added and improvement made in those carried over from the last edition. The splendid illustrations in *Gray* have long been known as the most effective and intelligible presentations of anatomical structures ever produced. In the edition of 1896 this series was increased by the addition of one hundred and thirty-five new pictures. The total of seven hundred and seventy-two illustrations comprise the number presented in this edition, many engravings being entirely new. In the colored plates the arteries are printed in red, the veins blue, and the nerves yellow. It is thus easy to trace them throughout their extent, and enables one to comprehend at a glance the exact relation of the various tissues and organs to one another.

Those who have old editions will be surprised to see the improvement in the late editions and can but realize why this unrivalled anatomy is so justly popular.

**Resolutions on the Death of Dr. Frank Abbott and Dr. Francis Peabody.**

THE following is the report of the Committee on Necrology, of the National Association of Dental Faculties, at Old Point Comfort, Va., on the death of Dr. Frank Abbott, of New York, and Dr. Francis Peabody, of Louisville, Ky.:

WHEREAS, Death has removed from our ranks, Dr. Frank Abbott, of New York; and

WHEREAS, On account of his social qualities, his genial companionship, and his ability as a practitioner and teacher of dentistry, we realize the great loss to the profession in his death; therefore be it

*Resolved*, That we tender to his family the sincere sympathy of this Association, and request that these resolutions be spread upon the minutes of this Association; and be it further

*Resolved*, That a copy of these resolutions be sent to the several dental journals of this country for publication.

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WHEREAS, Death has taken from among us, Dr. Francis Peabody, of Louisville, Ky.; and

WHEREAS, We feel that in his death the profession has sustained the loss of an able practitioner and teacher; therefore be it

*Resolved*, That we tender to his bereaved family our heartfelt sympathy, and that we cause these resolutions to be entered upon the minutes of this Association; and be it further

*Resolved*, That a copy of these resolutions be sent to the dental journals for publication.

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## OUR AFTERMATH.

APPOINTMENT.—Dr. Otto Arnold, Columbus, will hold the chair of operative dentistry and act as dean of the Columbus Dental College for the coming session.

A WISE PRECAUTION.—Patient—Isn't a little dangerous to administer anesthetics? Must be terrible to have one die in your chair after you have given him some. Dentist—Yes, it is; but we have adopted a rule where anesthetics are given, to get the patient to pay in advance.—*Ex.*

AMERICAN DENTAL WEEKLY is the title of a new 13 page weekly, launched Sept. 9th, 1897. Dr. B. H. Catching, Atlanta, Ga., is editor and publisher. Editorial work is not new to Brother Catching and we predict a very creditable publication. Our best wish is that he'll be catching many subscribers.

# THE OHIO DENTAL JOURNAL.

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## CONTRIBUTIONS.

### Tinkering with Continuous Gum.

BY L. P. HASKELL.

WHILE continuous gum work, after fifty year's experience, remains the only *perfect* denture made, when properly constructed the strongest, most durable, most natural in appearance, most agreeable to the tissues, and most cleanly, from time to time some one feels he must tinker with it, with the expectation of improving it or cheapening its cost. In every instance it has but proved a failure.

Soon after the introduction of vulcanized rubber some one thought by combining continuous gum with a rubber plate it would make it lighter and cheaper. But it soon proved a failure. Dr. Goldie, after making a few sets, concluded it was "like the devil's tail painted blue, more ornamental than useful." A few years after its disuse a dentist in Chicago brought it out again as something new and patented it, but he soon abandoned it. Twice since one dentist in Michigan and another in Pennsylvania discovered it again, but it soon passed into disuse. The serious objection to it was that if the patient broke off a tooth it was necessary to destroy the rubber plate in order to remove the continuous gum portion, repair that, and make a new rubber plate; an expensive repair.

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The editor and publishers are not responsible for the views of authors of papers published in the OHIO DENTAL JOURNAL, nor for any claims that may be made by them.

Many attempts have been made to produce low fusing materials, but these have proved futile, because a low fusing material was not the best for either artistic or permanent results.

The latest attempt in this line appears in a circular in which the writer, whose portrait adorns it, tells of his wonderful discovery, whereby this style of work which heretofore has mostly been confined to a few dentists who were thought to possess some particular patience or skill adapted for this kind of work, was no longer necessary, but by the adoption of the "Low Fusing Porcelain," 38-gauge platinum could be used, without fear of warping, much easier to swage and manipulate and with less expense, using a porcelain which fuses four hundred degrees lower than any other on the market." This he claims is the result of "long experience."

Fifty years ago John Allen began experimenting with low fusing materials, and after several years' experimenting, finally succeeded, with the aid of L. L. Close, in perfecting materials for this work, and this was on the market, and the only reliable one for thirty years or more. Thus having made up enough to supply the profession for that length of time. I commenced the use of it forty-six years ago and would not have given a penny to have it changed in any particular. When the supply was exhausted L. L. Close commenced experimenting and produced a somewhat lower fusing material, which while it is generally satisfactory, I should much prefer to have of the same fusing point as formerly.

There is one thing which must be remembered, and which some dentists do not seem to comprehend, viz: That the strength of this work is *in the metal*. The porcelain adds to it, but the foundation must be strong—nothing less than 28-gauge plate, reinforced at the heel, a flat wire around the margin, and continuous backing, with foot-piece resting on and soldered to the plate. I have made it a point to make the work as strong as possible, regardless of expense, and have been rewarded by securing the most durable work put in the mouth, lasting from twenty to forty years.

I can assure the profession that a tissue-paper plate (38-gauge) covered with the "lowest fusing" material in use, practically glass, is a poor substitute for continuous gum work—a mere cockle-shell. Such a structure will not sustain the strain very long in many mouths when it is subjected to strain. Glass will

sustain great pressure in a tooth but not the strain it is subjected to when spread thin over the surface of any plate, and especially of platina so fearfully thin. Then when it comes to mending, there will be entertainment.

The claim that low fusing materials are more easily worked than the high fusing, is simply ridiculous. It requires far more close attention, and one-half minute past the proper heat, would often ruin the work.

Another feature of this remarkable material is the *translucency* of the gum? Well, translucency of a tooth is desirable, but who ever heard of a translucent natural gum or membrane?

As to fear of warping, which is avoided by this process, I can simply say I have nothing of the kind, and use no support for the work except a slide and even remove it by use of long pliers grasping the case at the heel.

As to weight, I do not consider it a factor in the insertion of an upper denture. Patients do not complain of it, and never had to replace it with other work on account of weight.

No, do not destroy the integrity of this beautiful work by the use of such methods, for there is nothing so well rewards the thorough, careful and conscientious worker as the proper construction of continuous gum work.

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### Alveolar Abscess, Resulting from a Broken Nerve Broach.

BY R. D. WALLACE, D.D.S., SCIO, OHIO.

I WAS called to my office one evening to see a patient who was suffering from a throbbing pain in superior left second bicuspid. Examined tooth, found it filled with a large approximal filling, extending from mesial marginal ridge to gingival line, very sore to touch, considerable inflammation, and a little swelling. Patient said he had had medicine placed in tooth for two days, then the nerve was taken out and the tooth "filled with a silver filling."

I applied the rubber dam, washed the tooth with an anti-septic, and, with a fissure drill, entered the pulp chamber from the central sulcate groove and cut to mesial marginal ridge, tipped out filling, exposing a putrescent pulp, and with a Donaldson's

bristle broach, dipped in carbolic acid, entered the canal and removed putrescent nerve, but found I could not reach to a depth of more than two-thirds the length of root. I then washed it with peroxid of hydrogen, and tried a finer broach, but could get no deeper. As it was getting dark I placed oil of eucalyptus in canal and closed cavity. The patient returned next morning no better. I then entered the pulp chamber, under same antiseptic precautions, and found the canal in an antiseptic condition. Then tried sulfuric acid, followed by bicarbonate of soda, time after time, with no better results. Then tried to force eucalyptol through by means of India-rubber and plunger pressure, but was not certain that any reached seat of trouble, for I believed the canal hermetically sealed and told my patient I suspected a broken broach.

In answering his question—how will you get it out?—I told him that the theories of removing broken broaches, as far as I remembered, were: (1). Magnetizing an instrument and placing it in canal—broken broach will follow it out; (2). Eucalyptol, followed by peroxid of hydrogen—effervescence dislodges broach; (3). Sulfuric acid, followed by bicarbonate of soda; (4). Drill beside broach and with wheel bur make a few draw cuts, but they seemed impracticable here, and if we could get no relief from medicaments the only way to proceed was replantation, or alveolotomy. I placed a dressing of eucalyptol in canal and sealed cavity, painted the affected parts with iodin and aconite, equal parts, advised a hot foot-bath and a good cathartic, and if he got no relief, to come in at 3 P. M. Patient returned, no better. Decided on extraction. To avoid breaking the enamel, I padded the forcep beaks with cottonoid and carefully extracted tooth, bringing with it the abscess sac intact. Then packed the alveolus with a tampon of cotton, saturated with the following preparation;

Alcohol	-	-	-	-	-	-	-	1 oz.
Chloroform	-	-	-	-	-	-	-	2 ozs.
Sulfuric ether	-	-	-	-	-	-	-	$\frac{3}{4}$ oz.
Gum camphor	-	-	-	-	-	-	-	$\frac{1}{2}$ oz.
Laudanum	-	-	-	-	-	-	-	$\frac{1}{8}$ oz.
Oil cloves	-	-	-	-	-	-	-	$\frac{1}{2}$ dr.

Picking up the forceps, which still held the tooth, I dissected away the abscess sac and there, protruding through the apical foramen, was a sharp nerve broach.

With a pair of laboratory pliers, I carefully withdrew broach and sawed 1-16th in. off end of root, and smoothed it round with a file, washed canal with peroxid of hydrogen, followed by alcohol and hot air. Then eucalyptol, then chloro-percha and gutta-percha cone heated and forced into canal, smoothing end of root filling with hot instrument. Cavity filled with gold and platina alloy, and tooth placed in a 20 % solution of borolyptol, 98  $\frac{1}{2}$ ° F. Then rinsed mouth with same percent. solution, and removing tampon from alveolus, syringed socket with perhaps a little stronger solution of borolyptol and immediately placed tooth in the alveolus. It fitted so neatly that I did not think it necessary to ligate it. Painted the surrounding tissues with equal parts of chloroform and tincture of capsicum. Gave my patient a few capsicum plasters and told him to place one over the affected part every two hours, if pain increased, and to report in the morning. Patient reported first good night's sleep for a week.

Only a little soreness and swelling ensued, and the parts rapidly healed, the tooth becoming as firm as any of his other teeth.

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### Method of Crowning.

BY A. N. COATES, D.D.S., WEST UNITY, OHIO.

HAVING had some difficulty inserting Bing crowns in amalgam abutments because the amalgam in the bottom of the cavity breaks out or does not thoroughly imbed the stay pins, I tried another method which seems to be very successful. I hope others will try this method so that it may be fully tested in other hands. Very frequently it is necessary to make some sacrifice of a sound tooth if we would insert Bing crowns. We must not feel that because we are cutting a sound tooth that we should not cut it enough to give ample room for the work. I have reference to molars and bicuspids, where it is necessary to use soft filling materials for abutments.

I cut quite large cavities, then prepare the crown, usually cutting the pins off a little from the ends and grind to fit, getting the patient to bite frequently to get the proper articulation. Now, having the crown properly articulated, I proceed to fill the

cavities with a good amalgam and finish them as I would a permanent filling. Or, if the patient is able to bear the expense, gold may be put in. If amalgam is used it is best to let the fillings remain in the tooth for several days, for very few amalgams, and in fact I am not sure that any of them, harden as much in a day as they will in a week. I let them go several days before doing anything more. When the patient returns I cut out the center of the fillings just enough to accommodate the pins in the crown, and with either amalgam or cement secure the crown. By doing the work this way you know positively that the edges of the cavities are protected, while if you try to do the whole operation at one sitting you can have no assurance that the edges are all right because you cannot always see them.

The reasons why the cavities should be made large are now evident. The walls of amalgam *must* be thick so they will not break away from the edges of the cavity when the filling is cut for the crown-pins or bars.

If gold is used for abutments the work can be done at one sitting. I would then use cement or very dry amalgam to secure the crown bars in the fillings.

I cannot see why we should subject teeth to the irritating influence of bands and clasps to hold a crown, or, why we should proceed to do a piece of bridge-work necessitating the reduction of sound teeth to accommodate gold caps to which may be fastened a crown or bridge tooth when two simple cavities and a Bing crown seems all-sufficient.

Let us try to "uncomplicate" dentistry instead of complicate it.

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### A Cheap Crown.

BY W. C. KERNS, D.D.S., PIQUA, OHIO.

I do not claim my method of restoring crowns to badly broken down molars to be especially new, but perhaps it may be to some. Frequently we have cases where the patient is unable to pay for a gold crown, when in fact, it is the best method suggested. In such cases I make a silver band to fit the tooth the same as if crowning the tooth, fit and adjust the band, and fill with amalgam, allow the patient to bite, then remove the surplus after it is hard, burnish and you have an excellent cheap crown.

### To Obtain a Mandrel of a Root.

BY J. D. WHITEMAN, D.D.S., MERCER, PA.

TAKE a thin copper strip and with pliers secure the circumference of root in the usual way. Remove the band thus obtained, being careful not to change its shape. Press it into cuttle-fish bone to the depth of its width ; remove the bone that is inside the band, place around it a ferrule and pour into it fusible metal or soft solder. When cool remove ferrule and strip and you have an accurate mandrel that will be found a great aid in fitting a band to some roots that are extremely difficult as well as painful to fit directly to root in the mouth. Cuttle-fish bone may be obtained at the drug stores.

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### A Plea for Uniformity.

BY A. B. CRAWFORD, D.D.S., GRAND RAPIDS, WIS.

UNDER the title "Is it Justice," there appeared in the OHIO DENTAL JOURNAL, of 1896, an article in which I took the stand that a dentist who was entitled to practice in any one State of this Union ought also to be equally entitled to practice in any other State of the Union. Since that article appeared, numerous letters received would also tend to show from the ground I also took, that the non-graduate should have some of the good things of this world in the way of permission to make a change of residence, etc., as well as the graduate.

Numerous instances in which men who have been practicing in one locality for from fifteen to twenty-five years, and who for reasons that are sufficient in themselves, desire to make a change of climate, but not being graduates of a dental college they would run up against a dental board who might not agree with them, have been noted.

After reading over a current issue of the *Items of Interest*, and noting some of the really brilliant replies made to questions propounded by the State Board of New Jersey to *college graduates*, I am reminded of the story of Sargeant Jack —, of the Vol-

unteers of '61. He had commanded his company in many a hard fought battle, up and down through old Virginia and acquitted himself so nobly that he was recommended by his colonel for a commission in the regulars. Jack went before a board of West Pointers for examination. Not a solitary question could Jack answer in proper form, not even to the forming of a hollow square. He was asked what he would do if in command of infantry and attacked by cavalry? Jack replied, "Form a hollow square and give them h——l by G——d!" His examination papers got before Mr. Lincoln, without a recommendation attached by the board. Mr. Lincoln found the one correct answer and endorsed—"Give this man a commission." Now, it may be that those graduates are competent to practice dentistry although they cannot pass an examination that is creditable. Of that I cannot say, but it is pretty certain that the non-graduate that has been practicing in one locality for ten years or more, even though he could not pass before a dental board, such an examination as would entitle him to practice, is at the same time in a much better position than almost any recent graduate, for, like "Jack," he has learned the art in actual service and will seldom make a blunder.

I do not wish to be understood for one moment as being antagonistic to the State dental boards, but let us have a general law for all the States alike, and a graduate who passes before the National Board, whose representatives should examine for all dental colleges, before diplomas are granted, be permitted to practice anywhere he pleases in this Union. A verified certificate that a non-graduate has practiced ten years in any State, or altogether, should be his passport to any other State in the Union. We are but one great people and are all under one flag.

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### Practical Suggestions.

BY J. F. REES, D.D.S., OWENTON, KY.

**TIN FOILING A CAST.**—Cover with No. 30 tin foil. Do not run foil too high up on the sides. It is best to have a narrow rim on inside of plate that is not made smooth by foil. It sticks better than if the foil runs clear up to top of plate. Before putting flask together rub the foil with French chalk, powdered, such as

is found in shoe stores, and the foil will come off without any trouble after vulcanizing.

VULCANITE SCRAPER.—Take an old case knife of good metal and grind the edge square, make the blade rounding at point. This makes a scraper that will cut better than any, and is easily sharpened by holding it square against the stone. It works like a piece of glass shaving wood. It is best to break off about two-thirds or half of the blade before sharpening.

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### The Lower Third Molar.\*

BY W. H. TODD, D.D.S., COLUMBUS, OHIO.

THE subject of this paper is to me a very interesting one, and at the same time it has caused me as much anxiety as any other lesion we have to treat, and hoping it may prove as interesting to the members of this Society, I have brought it before you for discussion.

Among the many perplexing pathological conditions that come under our observation, are a number that have their origin from an impacted lower third molar.

Some of these lesions are decay of the sulci under the operculum of gum, exposing the pulp, a cause of irregularity, periodontitis, periostitis, alveolar abscess, trismus, stomatitis, osteitis, necrosis, reflex neurosis, etc.

In referring to these different lesions I will cite a few cases that have come under my observation.

Should a child in its first or second year have spasms, even the laity have been taught to look at its mouth and see if it is caused by an erupting tooth. Why should not our medical friends be warned by us to expect trouble from the lower third molar, and send their patients to a dentist when there is any doubt?

Some time ago a patient presented who was being treated for facial neuralgia by her family physician. As she did not improve she applied to her dentist, who, after examining a splendid set of teeth, informed her that they did not cause the trouble. After two days the dentist was again sent for and upon making another examination, the left lower third molar, which showed its

\* Paper read at Northern Ohio Dental Society, June, 1897.

anterior cusps, he found by lifting the gum cap, the sulci decayed and the nerve exposed; after extracting there was no more trouble.

Occasionally we see a well-filled mouth with twenty-eight large, perfectly formed, regular teeth with the gum well back of a narrow neck showing a long crown, belonging to a delicate young person of twenty, and all we can find is a few fissures to fill. The next time we see the mouth there are thirty-two teeth with three or four proximals, the superior laterals protruding and the lower incisors piling upon each other.

The extracting of the wisdom teeth may not correct the damage done, but it will relieve any future trouble from that crowded condition.

Dr. James E. Garretson says: "This peculiar lesion of a half erupted wisdom tooth may well claim a moment's attention. Many a practitioner has been so deceived by the anomaly as to have been led widely astray in the study of his cases."

Dr. J. B. White: "An impacted third molar at the base of the coronoid process is capable of giving as much excruciating and persistent suffering as it is possible for human nature to endure. Indeed, there is no abnormality or lesion coming in the province of the oral surgeon, which demands more prompt action, or for the time more thoroughly taxes to the utmost his best judgment and skill."

We have a great many cases of periodontitis that are relieved by lancing. In doing so a large piece of the gum cap from over the wisdom tooth must be cut away to keep it from healing over the tooth again, and then often the trouble is caused by pinching when the two jaws come together.

The best way to dissect off the fleshy lid, is to run your lance under the gum over the tooth from the corner of the mouth on the opposite side from the tooth and lance up, commencing with the point of the lance; then with a pair of gum scissors from the same side of the mouth as the tooth cut the piece out.

The erupting of the crown, and the ultimate freedom from inflammation, will show that it was due to an irritation of the periodental membrane caused by interference with the elongatory process.

One case, after suffering for weeks with an erupting *dens sapientiae*, it came through, outside of the dental arch, pressing

against the cheek, causing a very bad ulcer. That was relieved only by extracting the tooth.

We can have an aggravating case of odontalgia and hypercementosis with decay or absorption of the second molar, caused by the crowding of the wisdom tooth.

When the second molar has a large crown and small neck or leans posteriorly, the third molar is held just below the cervix. In cases of that kind, lack of room and the position of the second molar may necessitate the extracting of that tooth.

Mr. A., presented with an alveolar abscess. He had been suffering for two years from a fistula on the external surface of the right cheek opposite the superior first molar with a constant discharge of pus excepting for short intervals, when it was being treated through the fistula by some physician.

Extracting the right lower third molar, and a number of treatments performed a cure. The tooth extracted gave no signs of producing the trouble, but from its crowded condition, I decided to extract it, and had this fortunate result.

Trismus or partial tetanus, a contraction of the masseter muscle by the irritation of the motor branch of the trigeminus, is frequently caused by some dental disorder. The most frequent of these is an imprisoned third molar.

The locking of the jaws, together with the position of the tooth, make extracting very difficult. There are two ways to unlock the jaws. Use hot water and bathe or steam the face, at the same time insert Maunders screw gag between the teeth and gradually wedge them apart.

Another method: Administer an anaesthetic and use the wedge of Scultetus, (first covering the ends with rubber tubing to protect the teeth), and force the jaws open, then with the Physic forceps elevate the tooth, extracting it with a suitable pair of forceps that will hold the tooth, thus preventing its falling back in the trachea.

I had an interesting case where the lower third molars were extracted for crowding and fear of future trouble. We administered ether as the teeth were quite difficult to extract. After the operation the face began to swell, there was inflammation and contraction of the muscles, causing partial closure of the mouth, but only a little soreness and not any pus. With syringing and bathing to keep the sockets free from any irritation, and the

exercise of the jaws by the chewing of wax, they became normal after about six weeks.

I had one case that could come under the head of stomatitis. A patient presented who had been suffering for some months with a disease of the soft palate, which would finally relieve itself by the discharge of pus from a number of small fistula openings over the entire right half of the palate.

The right lower third molar was only half through. I advised its extraction and the case got well.

One of the most difficult diagnosis to make, and most varied in its result is reflex neurosis, caused by an irritation of the trigeminus from some dental lesion, among which is the imprisoned lower third molar.

A lady presented, who was being treated for otitis by her physician. She had severe pain in her left ear. On examining her mouth, I found a left lower unpacked third molar, which I extracted and the earache was relieved.

The extracting of the second molar for the purpose of making room to extract the third molar is only advisable in a very few cases.

This paper is not intended as advocating the promiscuous extracting of the wisdom teeth. At the same time I would not hesitate to condemn that tooth if it was the cause of any serious trouble, that in any other tooth I would do my best to try to save.

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### Pyorrhea Alveolaris.\*

BY H. H. HARRISON, D.D.S., WHEELING, W. VA.

ALL diseases are said to have two causes—a predisposing and exciting cause, and I presume the one under consideration is no exception to this general law.

To say that it is a necessity to know the etiology of all diseases before scientific treatment can be administered, is certainly not true, though in many cases it would be very helpful, and in some instances a real necessity.

To make a proper diagnosis is absolutely indispensable before administering to any patient no matter what disease comes before

\* Paper read at Odontological Society, Western Pennsylvania, June, 1897.

you. The etiology of pyorrhea is somewhat obscure, as scientific men seem to differ very much. The diagnosis, however, has no obscurity hanging over it, for the symptoms are plain and unmistakeable. Thus far we seem to have been treating the symptoms or the result of the disease, and with but little good so far as a cure is concerned. A bitter fountain will send forth bitter water, and we may sweeten the water in the stream, but the fountain will soon fill the stream with a fresh production of bitter water. The fountain must first be made sweet, then its product will be sweet. Pyorrhea is undoubtedly a systemic disease, and though we may relieve a patient of some of the results of the lesion by local treatment, yet it cannot be cured until the cause is removed. Hence it would seem a necessity to know the abnormal condition of the system in this disease before we may hope to effect a cure, and possibly even then it may be a matter of uncertainty. However, it is eminently proper for us to inform ourselves of the cause and conditions surrounding the disease, the better fitting us for applying the therapeutic remedies which science has placed in our hands.

I believe the disease then to be systemic, and that the local manifestation in the mouth, is only one of its special symptoms. There are many other lesions of the body concurrent with this. Altered secretion, to my mind, is the main pathological condition—pyorrhea, heart disease, rheumatism, albuminuria, gout, and possibly other diseases are the pronounced results. That many of these conditions may be produced by other causes, I have no doubt, but that they are developed from this cause I am well persuaded. Pyorrhea does not often occur before the middle of life. In the early part of life the secretions have an acid reaction, and at a later period they become neutral and then alkaline. Until this alkaline period takes place, pyorrhea does not occur. When it does take place, the lime taken into the body has not acid sufficient to keep it in perfect solution, and it passes through the circulation in a partially undissolved state, producing irritation in the liver, kidneys, heart and other organs, and in its sluggish passage, lodging in the joints, muscles and other important places, as in the alveolar process and gums. The whole body gets a tonic principle from the secretion when it has an acid reaction, and without this tonic any structure may fail to perform its normal function. It is easy to see under such circumstance why

the alveolar process could break down, the gums recede, and the further result of the loosening of the teeth and the formation of pus take place.

Another phenomenon that occurs in well defined cases of pyorrhea is, that we very rarely find teeth decay. Another thing, I have never seen a single case of Bright's disease that was not affected by pyorrhea; and all gouty patients are affected in the same way. Hence it has been said that it never occurs save in the gouty diathesis. I think they are both the result of altered secretion.

A few years ago I had a patient with pronounced symptoms of pyorrhea, heart trouble, rheumatism and kidney disease, together with stomach indigestion. She suffered greatly from regurgitation. Could not retain the food in the stomach. Her physician told her she had too much acid. I advised the use of acetic acid after each meal and the regurgitation ceased at once. She was afterwards treated with dilute hydrochloric acid, strychnia, and quinine, and the main troubles disappeared.

The treatment should undoubtedly be acid and tonic, together with local cleansing and stimulants. One of the great troubles in the treatment is, that like Bright's disease, its approach is so insidious and slow, that it has become so thoroughly chronic before it is discovered, that its cure is very tedious, and even if cured, leaves its mark. I think by accident some cases have been cured, but not many. I have had no cures myself for the reason that patients tire of the protracted treatment. Nearly all persons affected with this trouble are great sweet-meat eaters. Don't like sours of any kind or degree.

However, we may not be able to make a thorough cure, we may arrest the progress of the disease by proper treatment, as I have done in very many cases. I think by persistent work by both patient and dentist the re-establishment of an acid reaction in the fluids can be accomplished, and the result will warrant the effort.

**The Relations Between the Oral Cavity and the General System.\***

DR. WALKER, a Virginia physician, introduced by Dr. E. P. Beadles, addressed the Association on the relationship between dentistry and general medicine. He said that the statement that most of the diseases to which humanity is liable have their origin in the stomach, is true to a certain extent. Ptyalin, the active principle of the saliva being an essential factor in digestion, the thorough mastication of food is very important, as digestion cannot be properly carried on if defective teeth interfere with mastication, preventing the proper admixture of ptyalin.

Again, when the teeth and gums are diseased food is taken into the stomach loaded with bacteria which find in the alimentary canal abundance of pabulum for their continued existence and increase. Thus an active element of disease is found in auto-infection from diseased teeth. Not infrequently, he said, his first step was to call in the services of the learned dentist whose assistance he had found invaluable. Many diseases—neurosis, abscesses, etc.,—demand the skill of the dentist rather than the learning of the physician.

DR. H. E. BEACH said this called to his mind a statement made by a learned professor in Philadelphia in 1869, who, in lecturing on "Diseases of the Alimentary Canal," said that in his opinion four-fifths of the human family died from some disease of the alimentary canal. To this, Dr. Beach added the statement, that in his opinion, and he did not think it could be successfully controverted—three-fourths of all the diseases of the alimentary canal have their origin in some pathological condition of the mouth. Thus, if this fact was recognized by physicians, three-fourths or four-fifths of the present mortality of the human race could be avoided or greatly lessened, by keeping the mouth in healthy condition.

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\* Remarks at Southern Dental Association, Old Point Comfort, Va., August, 1897.

### An Obscure Case.\*

BY W. E. WALKER, D.D.S., PASS CHRISTIAN, MISS.

IN January, 1890, patient called for treatment of an acute slight attack of pericementitis, left superior second molar, there was noticed in the roof of the mouth a slight discharge of a thick tenacious jelly which would be drained out with tweezers but was too thick to be wiped off. Patient declined treatment as "it had been there three or four years without causing any trouble except that about once a year it would swell up, but pass away again." In December, 1894, the patient called again with a similar attack of pericementitis in the same tooth, pulp apparently vital, tooth not decayed. She also desired treatment for the affection of the roof of the mouth as it had attained the prominence of half a robin's egg and was so sore that it made deglutition painful.

On the summit of the prominence was a small pustule which, however, on lancing, proved to be merely superficial. Pressure caused exudation of the glairy mucus above described. Injection of an aqueous dilution of tinct. iodin seemed to press on a deep-seated pocket of the accumulation, which seemed to contain small masses of more solid matter causing the discharge to resemble frog spawn. Exploration with probe encountered only soft tissues. A deeper incision was followed by more of this glairy substance. The wound was cauterized with nitrate of silver crystals every other day, until no further discharge appearing, the wound was allowed to fill up with granulations, but when the surface had become nearly normal, it was found that there were three small openings instead of the original one. The patient was then called out of town and was not again seen until February of the present year, when the patient returned, deglutition being again painful from increased swelling. Painting with tincture of iodin has reduced the swelling but the discharge continues and there are now eleven small openings.

In April of the present year a specimen resected from the center of the affected area, and including most of the stomata, was sent to a professor of bacteriology and histology—who is also

\* Abstract of Paper read before the Southern Dental Association, Old Point Comfort, Va., August, 1897.

a specialist in this line of work—who reports the growth “malignant, probably carcinoma,” and advised a more radical operation for removal. The case remaining apparently in *statu quo* under the iodin painting treatment operation has been deferred until the case could be presented at this meeting for consultation and advice. In the discussion of this paper—

DR. JOHN S. MARSHALL said that it would be difficult to make a diagnosis in such a case from mere description without seeing the patient. It would strike him as being a cyst, originating, perhaps from the palatine molar root, or to an undeveloped third molar. From the character of the discharge, as described, it would appear to be due to cystic degeneration.

DR. SMITH, of Massachusetts, suggested an X-ray photograph.

DR. BROPHY said that the gelatinous discharge described was that peculiar of cysts of that region and recommended more thorough exploration and a more extensive operation. Thought it might perhaps be due to a retained deciduous or supernumerary tooth.

DR. GORDON WHITE had had two cases similar in many respects to the description given, one of which was found to be due to a supernumerary tooth, and the other to an unerupted bicuspид.

DR. W. T. ARRINGTON had had a case with exudation of the same character. Being unable to locate any cause for the trouble he decided to remove the tooth nearest the seat of the disease, and to his surprise found that it was a dead tooth, though absolutely free from decay. He thought that if Dr. Walker would remove the nearest molar the patient would get well.

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### Photo-Micrography.\*

BY DR. T. P. HINMAN, ATLANTA, GA.

THE value of photo-micrography cannot be over-estimated as an illustrative method in the study of histology and pathology. The great advantage over drawings is that the mind of the artist cannot influence his pictures. In drawings, the artist whether

\* Abstract of Paper read before the Southern Dental Society, Old Point Comfort, Va., August, 1897.

intentionally or unintentionally, gives his views instead of the actual tissue involved. The difficulties encountered in this work are greatly over-estimated, as any one who can intelligently manage the microscope and has a limited knowledge of photography, can make photo-micrographs. The apparatus can be bought very cheap. The ordinary photographic plate of any good standard is all that is necessary. Dr. Hinman then went into minute instructions in the details of the process, and exhibited a series of interesting slides of his own make, showing sections of the dentine, the alveolar process, the peridental membrane, introglobular spaces, the interzonal layer, calcific matter deposited in the root of a tooth, carious dentine, a section of enamel when Nasmyth's membrane has been worn away, exposing the ends of the enamel rods, etc., etc.

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### The Compatibility of Different Filling Materials with Tooth Structure.\*

BY DR. I. N. CARR, DURHAM, N. C.

THE use of gold, tin and amalgam, in filling teeth, is almost as old as dentistry itself, and the peculiar characteristics each possesses has been discussed many times over in our meetings, but since the more recent investigations of histologists in the minute structure of the teeth, and our own verifications of their statements we are enabled to discuss the subject more intelligently. We have learned that the teeth, although apparently so solid and dense, do not differ greatly or materially from other organs of the body in the processes of waste and repair; the only part of the tooth wanting in organic matter is the enamel, and that constitutes but a very small portion of the whole tooth structure and does not enter into the problem under discussion, a mere edge only being generally the only part in contact with filling material. The tooth being thus a vital structure, what should be the underlying principle governing the methods employed to arrest its destruction by decay? Do the methods adopted before we had obtained our present knowledge of the nature of the tooth accord with the physiologist and the histologist? Is it not rather in

\* Abstract of paper read before the Southern Dental Association, Old Point Comfort, August, 1897.

direct opposition to natural law? Pounding the living tooth with a heavy mallet cannot be defended on scientific grounds. No one would think of attempting to arrest and prevent disintegration of any other vital organ by abrasion. When you pound gold with a mallet you increase the crystallization. The tendency of all crystalline bodies is to run into a spherical form. We see this illustrated in water as it freezes in any confined space—it bulges outward and breaks the vessel which contains it. In the use of cohesive gold you have a crystalline body. Coming into contact with a living structure—a fibrous body; then, where is the compatibility of the two substances! The filling material should be in harmony with tooth substance. It should be amorphous or structureless in its character to correspond with the amorphous substance in the interglobular spaces. Such are tin and gutta percha and to a certain extent non-cohesive gold—gold that is "dead-soft." The same argument applies to amalgam as to cohesive gold. Its granular character makes it easy for it to absorb the amorphous substance in the interglobular spaces that are needed by nature to nourish the tooth and to assist in repairing the damage done by decay. Tin foil is the best material known for permanent work. Amalgam answers a purpose and until we have something that is better, that is as cheap, it would be hard to get along without it when we must have something plastic. But it cannot compare with non-cohesive gold as a tooth-saver.

DR. L. M. COWARDIN said that the question when properly analyzed resolved itself simply into that of the conducting power of the material employed, but unfortunately the materials which are *the best* in that respect do not have sufficient power of resistance to attrition. Much also depends upon the idiosyncrasies of patients. Some teeth are so extremely sensitive that a non conductive substance must be employed for filling; again, there are others that are scarcely susceptible to pain in excavating, so little that it is difficult to determine that they are vital, and yet which may develop such serious neurosis within forty-eight hours after filling as to necessitate removal of the filling. It should therefore be the rule of every thoughtful operator to interpose some non-conducting substance between a conductive filling and sensitive tooth-structure. It is to this habit that he attributes the fact that for the past ten years he rarely has any after neurosis due to thermal

changes. He said to prevent certain ideas advanced by Dr. Carr from misleading our younger members, I wish to say that I contend that filling teeth does not prevent decay; it simply arrests it, and that unless germicides are used in the bottom of the cavity, to prevent further acid fermentation, the filling will not arrest decay. You may fill as perfectly as you can, and polish as bright as you may, but vitiated fluids and lactic acid formation will continue to break down tooth structure.

DR. H. E. BEACH: If I can *arrest* decay for forty years I am satisfied with that. I say that filling will prevent—does prevent decay. There are some gentlemen here that have seen teeth that were filled thirty or forty years ago, that are doing good service now. The teeth were decayed forty years ago; any further decay has been prevented. The tooth was put in such a condition that it was not so liable to decay as it was before it was filled. I fill teeth to prevent any further decay in that locality. I protest against the practice of lining cavities with cement to prevent them from being affected by thermal changes. I would interpose something between the dentine and the cement which eliminates phosphoric acid and affects the pulp injuriously.

From its resinous nature, pine-tree resin, in its refined state, mixed with chloroform or alcohol and spread thickly in the bottom of the cavity, is an excellent application. It is not susceptible to thermal changes and it is impenetrable by gas.

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### Phenomena of Cataphoresis.

BY WESTON A. PRICE, D.D.S., CLEVELAND, O.

(Continued from page 467.)

Now, to return to

#### THE APPLICATION OF A CONSTANT CURRENT TO THE DENTAL ORGANS.

Where will the current leave the dental nerve if the positive pole be upon the exposed pulp and the negative elsewhere? Not to discuss the anatomical structure of the pulp—nearly two-thirds of a pulp consists of blood vessels and their contents; much less than one-third nerve fiber, and the balance connective

tissue, etc. The blood has a greater conductivity than the nerve tissue for the same cross-sectional area, consequently most of the current will travel through the surrounding tissue and not through the nerve tissue. The size of the apical foramen and the resistance through the walls of the pulp-chamber are of some importance in this connection, but time will not permit their discussion here. In the case considered above but a very small per cent. of the entire current flowing would travel for any distance on the nerve fibers, since it would go direct to the less resistant tissue. Suppose the current applied just as in the last case, except that the pulp is not exposed and the current must pass through the dentinal tubes. Here it seems to me would be an ideal condition for the demonstration of either the polarization or the purely inhibitory theory. We would expect that since these tubes contain chiefly the projected fibers of the odontoblastic or spindle-shaped nucleated cells surrounding the pulp, which are supposed to be the periphery endings of the dentinal nerves, the current would of necessity have to pass through these structures to the pulp before it could disseminate to the other structures. Of course the lime salts of the dentin are a non-conductor. If any effect is produced by applying the current in this manner through the drill it must be on this structure in the tubes, for it would disseminate immediately on arriving at the pulp tissue.

We shall not discuss whether or not these cell projections fill completely the space of these tubuli, probably so, or very nearly so. However, the fact we wish to establish can be easily clinically demonstrated.

Will the constant current applied under these conditions produce anesthesia of the part to any considerable extent? I answer guardedly and after giving the question a very thorough investigation, No. From a physiological standpoint it would not be possible, since we are dealing with a sensory nerve, the most sensitive one in the body, whose function is to produce the sense of pain with the very slightest irritation, and the most sensitive one in the whole human structure. If the sensory nerve did not respond in the form of pain to the passage of the current, we would expect even then the amount of current necessary to produce this condition, judging from motor nerves, would be many milliamperes.

But you say the impulse which carries the sensation of pain in the sensory nerve is related to the internal nerve-current of the nerve, discovered by Du Bois-Reynold, and why could not this impulse be interposed by an artificial current, thus not permitting the pain impulse to pass? There are two answers: First. This nerve current always travels from center to periphery in motor nerves, and from periphery to center in sensory nerves, always in the direction of the impulse, hence it would be in the same direction as the polarizing current, which really increases this nerve-current when in the same direction. We should then expect on this theory an increase of sensitiveness. Again, the normal sensory impulse has no connection with this nerve-current, and furthermore, the origin of this nerve-current would answer this question. I think it is inconsistent to expect to be able to pass enough current through that sensory nerve to produce the condition of anelectrotonus, since the pain limit will not permit of scarcely the thousandth part of so great a quantity of current to be passed as would be necessary to produce that same condition in a motor nerve, provided the sensory nerve were capable of an analogous reaction. For the clinical answer to this question I have tried in vain to produce this condition, using every variety of conditions in the tooth, and all combinations of potential and resistance possible in instruments on the plan of this theory. It is very simple and would be ideal if possible. Any good cataphoric apparatus will produce every possible combination of any of these instruments in use at the present time.

The Horton instrument has a possible total potential of less than six volts and has a variable resistance of less than 50,000 ohms in series and divided into twenty-four divisions, in such a way as to make almost any combination up to that total possible.

I have demonstrated elsewhere and verified repeatedly (see OHIO JOURNAL, or *Cosmos*, February, 1896,) that

#### THE RESISTANCE THROUGH A TOOTH,

according as the cavity is wet or dry, will vary from thousands to hundreds of thousands of ohms. I have measured cavities in dentin after dehydrating and found them to vary all the way from 20,000 to 1,000,000 ohms, and in different parts of the same cavity almost that amount of variation over the surface of the dentin alone, while through the enamel, of course, those figures will be multiplied by thousands.

Two things must be evident to everyone at a glance, viz., that in delivering the current to a tooth, from the bur as the positive electrode, it is impossible to have a uniform amount of current flowing as the bur is moved to different parts of cavity, owing to the variableness of resistance of the different parts of cavity; and that with so very high a resistance it would be impossible to have more than an extremely weak current flowing unless the potential were very many times that used.

With my instruments I can measure with precision and express in amperes any amount of current from a one-hundred-and-twenty-five millionth of an ampere to one-twentieth of an ampere. I measured the actual amount of current flowing in amperes in the use of two of these instruments, as used by their exponents, and found it to vary from six millionths of an ampere to one-twelve millionth in one case with one, and from one six millionth to one sixty millionth of an ampere in one case with the other instrument. In my own subsequent investigations I have collated a considerable of data showing a much greater variation than the above. In view of the fact that this condition of anelectrotonus is in direct proportion to the amount of current flowing, I have passed as high as two milliamperes of current through a healthy live pulp and tried to work on it at the same time, but could not produce this condition of anelectrotonus. I have even let so strong a current flow for fifteen minutes and not been able to touch the pulp even slightly without pain. We saw from the law established by Pfluger that this condition was in direct proportion to the amount of current flowing, hence how impossible for the millionth part of an ampere to produce this condition if two thousand times as much did not.

Another law enters at this point, making the realization of the anelectrotonic condition of the dental nerves impossible, which is the law of stimulation of an electric current. This law holds that it is the sudden variations of current strength that excite muscular contraction in a motor nerve or in a sensory nerve produce its normal impulse, pain. Hence when the current is delivered to the tissue from a revolving bur, every blade brings with it an interruption of the current strength, which if the current strength were great enough to produce anelectrotonus would produce unbearable pain.

I have an abundance of reserve proof for sustaining this

position, amongst which are the personal experiences of two different afternoon's use of this process on my own teeth by the original introducer and a couple of other similar applications of the method by other advocates, also using it myself on very many patients. Try it yourself; the only precautions are to insulate the tooth and the hand-piece perfectly and begin with a minimum amount of a constant current and gradually increase.

#### WHAT ARE THE LAWS GOVERNING OSMOSIS ?

This theory provides that when we apply an electric current to tissues, with an interposing layer of some medicament under the positive pole, that the medicament itself will be carried into the tissue by means of a physical force possessed by the current. *What is osmosis?* It is the diffusion of a dissolved substance in a solvent to equalize the concentration.

If a layer of pure water be placed over a solution of sugar the system immediately commences to suffer a change. The particles of sugar immediately rush from places of a higher to places of a lower concentration. This diffusion process, as the phenomenon is called, does not cease till the concentration has become the same in all parts of the solution. Let us imagine the sugar to be separated from the pure water by a semi-permeable membrane, such as will allow of the passage of the water, but not of the sugar. Of course the sugar will exert a pressure, and since it cannot go to the water it will produce a hydrostatic force against the partition, moving it upward, if the apparatus be so arranged that it can, or if the partition cannot move, and the chamber in which the sugar is confined be arranged with a capillary tube, the water will pass into the sugar solution through the membrane, increasing the volume of the confined solution, causing it to rise in the tube to a height equal in weight to the osmotic pressure of the sugar. This condition exists in any possible solution and is influenced by many conditions. The osmotic pressure of cane-sugar in water has been demonstrated by Pfeffer, using cupric ferro-cyanid as the semi-permeable membrane. He has shown that a saturated solution exerts a pressure of about four atmospheres, which would at the ocean level be about sixty pounds to the square inch. The osmotic pressure is in definite proportion to the concentration and temperature. This condition is perfectly analogous to that of a gas confined within enclosing walls. It

exerts a definite pressure which is influenced both by temperature and density. The molecules of the gas tend to fill all the space, each endeavoring to get as far from every other molecule as possible. Just the same condition exists among the molecules of the dissolved substance; every molecule endeavors to get far away from every other molecule, thus filling the greatest possible space; and they will continue to do so just so long as more pure solvent is provided.

It has been demonstrated by Nernst and Vant-Hoff and others that "The osmotic pressure is independent of the nature of the solvent, and in general obeys the laws of gases."

The various proofs for establishing this law are given in Nernst's Theoretical Chemistry, 1895. It has also been demonstrated that "Solutions having the same osmotic pressure can be obtained by dissolving equimolecular quantities of the most various substances in the same solvent."

It has long been noticed that a coincidence existed between the osmotic pressure of a substance and the gas pressure of the same substance. It is not known that "The osmotic pressure is exactly the same as the gas pressure which would be observed if the solvent were removed, and the dissolved substance were left filling the same space in the gaseous state at the same temperature." There is a constant relation between the osmotic pressure, the freezing point and the vapor tension of substances of the same molecular specie.

Nernst says that "The question as to how the nature of the solvent influences the osmotic pressure of the dissolved substance is at once settled by the fact, that in so much as it is identical with the gas pressure there is no dependence at all between the osmotic pressure and the solvent." Which fact is easily demonstrated.

The laws governing the phenomena of osmosis are very clearly understood and so perfected that the exact constants and temperature co-efficients are known for a large number of substances.

Time will not permit of anything but the most hurried resume of the laws governing osmosis, but from even the few just quoted we can make some valuable deductions as to the rôle this force plays in the process of cataphoresis.

## WHAT ARE THE LAWS GOVERNING?

Since the nature of the solvent has nothing to do with the osmotic pressure, it at once becomes obvious that—First. It does not matter what solvent we use for our cocaine (provided it is the force of osmosis that accomplishes the work). Second. Since the osmotic pressure is in direct proportion to the concentration, the solution should be as nearly saturated as possible. Third. Since the osmotic pressure is increased to a definite extent by each degree in increase of heat, the solution should be kept as hot as possible.

These observations hold good for practical application, if the force we are dependent upon is osmosis.

WILL OSMOSIS CARRY COCAIN INTO DENTIN TO ANY CONSIDERABLE  
EXTENT?

To answer this I have sealed a saturated solution of cocaine in cavities for two days, and again for two months, without producing anesthesia except on the very surface of the cavity. I have also applied it for some time on an exposed pulp and could not cut very far into it. Sulphate of strychnin and bichlorid of mercury applied on cotton to the chests of frogs produced no physiological effect, while with a current death was produced in a few minutes. This answers the question whether osmosis alone can produce this condition. Now for the theoretical suggestions. We know that if a saturated solution of cocaine be placed in a cavity there will be a difference of concentration between the cavity and dentin and the cavity and pulp. We know also that the velocity of migration of the dissolved salt will depend on two things: The osmotic pressure or "head," and on the resistance. We have all observed how slowly a very fine precipitate settles. This is the resistance of the solution. Just so the resistance of any solvent to any dissolved substance can be determined from the osmotic pressure and velocity. Now as a matter of fact all cell tissue and porous partitions offer great resistance to osmosis, and many cells have the power of permitting some substances to pass while excluding others. In the dentin we have both of these conditions, and it would be expected that a very great barrier would exist here to the osmosis of the cocaine. We are forced to conclude that osmotic pressure is not the force on which depends the transmission of cocaine through dentin into the pulp.

(To be continued.)

## The Facial Line and Angles in Prosthetic Dentistry.\*

BY W. E. WALKER, D.D.S., PASS CHRISTIAN, MISS.

THIS paper is designated as No. 3, being a continuation of the line of thought presented in paper No. 1, published in *Cosmos*, January, 1896, and No. 2, published in the *Journal* of the American Medical Association, February 6, 1897. The importance of the study of the teeth, in connection with the reproduction of the maxillary movements in mastication, is pointed out by Dr. Broomell (see *Cosmos*, January, 1897), who says: "Each individual tooth in itself tells of the nature of the movements in the inferior maxilla during mastication, and these inherent movements, established in accordance with the formation of the natural teeth, should not be interfered with in prosthesis."

In the short movements of mastication the condyle on the side toward which the jaw is advancing travels forward and downward on a line which being extended till it intersects the facial line, forms at the point of intersection an angle which varies with and bears a definite relation to the morphology of the morsel surfaces of the teeth. As this angle varies very considerably, not only in different individuals, but quite frequently in the two condyles of the individual, it is important, *first*, to be able to determine accurately the direction of the movement of the condyle—the condyle-path as I have called it—compared with the facial line, and the plane of occlusion, and *second*, to be able to exactly reproduce the movements of the jaw in an articulator carrying the substitutes for lost dentures. The path traversed by the condyle, extended till it intersects the facial line, forms what I have termed the condyle facial angle. The difference between this angle and that formed by the alveolar plane and the facial line, is the condylo-alveolar angle. The importance of the study of these lines and angles is pointed out by Dr. Broomell in the article before referred to, with special reference to ascertaining the tooth-line level, which, Dr. Broomell says, is always horizontal to the basal line of the facial angle.

To measure the condyle movement and these various lines

\* Abstract of paper read before the Southern Dental Association, Old Point Comfort, August, 1897.

and angles, I have devised an instrument which I have called the facial clinometer, which I will demonstrate in the clinics. The study of the facial line and angles is not only a matter of scientific interest, but is of practical value to the dental and oral prosthodontist who desires to receive that scientific accuracy essential to perfection in the practical value of and comfort to the wearer of dental prosthetic appliances.

In the discussion of this paper DR. GRANT MOLYNEAUX said that he had read Dr. Walker's series of papers and appreciated what he was doing in the cause of prosthetic dentistry, but could not agree with him on many points. He had adopted Dr. Bonwill's system of articulation because it was a perfect system, enabling us to teach the student by fixed and certain rules. He himself had carried out that system a thousand times or more and could not differ from him. He did not believe in destruction without a corresponding construction, and until Dr. Walker could give us something better than Dr. Bonwill's he would continue to follow the latter.

DR. BEADLES said that he would be glad if Dr. Walker would state his side of the question clearly in a few words, and let Dr. Molyneaux do the same, that it might be seen wherein the difference between the two systems lay.

In response DR. WALKER said that no one was more ready than he to give credit to Dr. Bonwill for his pioneer work in the line of articulating artificial teeth. Dr. Bonwill had devised an apparatus for the purpose of attaining certain conditions—a balancing articulation especially. In his own practical work in the laboratory he (Dr. Walker) had found that Dr. Bonwill's apparatus—his anatomical articulator—was faulty in that portion of the mechanism which controls the condyle movement, in that it reproduces a condyle movement which is forward, that is, parallel with the plane of occlusion. That this is not correct is seen by placing casts of the natural teeth in the Bonwill articulator, when it will be found that the cusps of the molars will interfere with placing the incisors in the biting position, and also with placing the lower jaw in the lateral position as for grinding. If casts of natural teeth cannot be placed in position to bite and grind in an articulator, there is something wrong in the machine. He found that the fault lay in the necessity for an adjustable angle, by means of which the actual movements of the jaw can

be reproduced. Being asked if he would demonstrate what he claimed, Dr. Walker replied that he would, and would do so in the clinics of the present meeting.

DR. W. T. ARRINGTON said that he had for many years confined himself to the old methods of articulation. He had tried to understand Dr. Bonwill's methods, but in vain. He had also failed to comprehend Dr. Walker's papers, but from his last remark he was forced to believe that Dr. Walker's ideas, as applied in his articulator, were as far above Dr. Bonwill's as Dr. Bonwill's were above the old friend plaster articulator.

DR. J. T. CRAWFORD said: We are still fighting the battle I engaged in eighteen years ago, when I urged the importance of a knowledge of anatomy applied to the articulation of artificial teeth. I regard Dr. Bonwill's work as very valuable, but if there is anything in the respective claims made, Dr. Bonwill's articulator will not stand the test. Dr. Walker has made a point on Dr. Bonwill in the reproduction of the movement of the lower jaw, as it sweeps downward as well as forward. If there is anything in Dr. Bonwill's claim for the necessity of an anatomical articulator, there is far greater necessity for Dr. Walker's physiological articulator, for it is essential that we should be able to reproduce the true movements of the lower jaw, in order to secure the points of contact simultaneously at the three angles of a triangle. If Dr. Bonwill and Dr. Walker, conjointly, have accomplished that they will have lifted prosthetic dentistry from the slum into which it had fallen; rescued it from the position of an incubus upon the profession.

DR. J. D. PATTERSON spoke of the acquired movements of the jaw common to persons of advanced age who had lost the natural organs, and the impropriety of attempting to normal overbite and articulation of youth and middle age to such cases.

DR. CRAWFORD said it was the duty of the dentist in every case to give a correct occlusion and a serviceable articulation.

DR. MOLYNEAUX: Dr. Bonwill never intended to convey the idea that the relation between the overbite and the curvature of line of occlusion was the same in every case. Conditions are modified by advancing age. I deny that in Dr. Bonwill's articulator the lower jaw does not move downward and outward exactly as does the human jaw. All imitations of or attempts to improve upon the Bonwill articulator have been failures. I

had one of the first Bonwill articulators that appeared, and having mastered his system, I unhesitatingly pronounce it the greatest boon ever bestowed upon prosthetic dentistry. I have no desire to antagonize Dr. Walker. I would be glad to have him show us a better way, but I do not think he has proved his position yet.

DR. WALKER, in closing the discussion, said that the essential thing was to be enabled to reproduce the movements of the jaw habitual to the patient in hand, and to be enabled to so arrange artificial teeth that they will articulate in accordance with those movements. The object of the physiological articulator is to reproduce the habitual jaw movements of the patient. With my articulator I know when the articulation is correct. If it is not right in the mouth, my articulator shows me how to correct it.

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## ALL SORTS.

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### Cataphoresis Dangerous to Living Pulps.

In an article in the *Items of Interest*, Dr. F. T. Van Woert speaks of this subject as follows: "I believe that those dentists who are using a high potential will have a batch of dead pulps on their hands in the near future. You may ask why I think so. If those who have small incandescent mouth lamps will place a lamp behind a tooth in a darkened room before beginning an operation, and notice the passage of the light through it, comparing with adjacent teeth, and then after you have produced complete anesthesia, place lamp there again, you will see exactly the same condition that you would get in a dead tooth, viz., an opacity. I first thought this due to the cocaine. Later I experimented to see whether that was so, and in many cases I got nearly the same result without cocaine. The discoloration was not so dense, but it was present and very marked. We will admit, for the sake of argument, that we may have failure with a low potential. Is it not better to have a few failures? Suppose you have a young lady on whose front teeth you are operating, and the tooth turns black? A young lady was sent to me nearly a year ago. In operating for her I first discovered this danger. I was treating a superficial cavity in the superior central. I did not have time to insert a gold filling, so I filed with phosphate and made another appointment. I put the lamp behind that tooth when she came again,

and I was very much frightened. I dismissed her, postponing the final operation from time to time for nearly three months. Today that tooth is as dead as any tooth ever was."

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### Method of Preserving Rapidly Decaying Teeth.

In a prize essay, by Dr. C. B. Colson, published in the *Items of Interest*, the following method is advanced:

" My present method of filling rapidly decaying teeth is as follows: I demand sufficient space in which to work. If the cavities are in approximal surfaces, I open by cotton packing, cork and sometimes rubber, and then keep the teeth apart with a peg of wood until the soreness leaves. With the rubber dam adjusted, and the cavity well dried, I attack the enamel edges with a very sharp chisel or excavator, but prefer to use a small, fine cut fissure drill or bur.

I cut back the enamel well before I proceed to excavate the cavity. I excavate the dentine with sharp excavators, using only hand instruments, as they are better controlled, and, if sharp, less painful. After as thorough an excavation as judgment will permit, we are frequently compelled to leave a small pad of decay at the bottom of the cavity for fear of exposing the pulp. Believing that the apparently normal dentine and enamel are not as healthy as they seem, of course, it is not satisfactory to leave this pad of decay, which is composed of particles of broken down dentine, micro-organisms and other septic material absorbed from the saliva; nevertheless, we are forced to leave it. To fill over it with any material without first taking necessary precautions, would be fatal to the success of the permanent filling. It is the bacteria thus left within the cavity which destroys many teeth, however carefully lined and filled.

After excavating, my next step is either to dry out the cavity with warm air, and I frequently do this while excavating as it reduces pain to a minimum, which should be a slow stream of warm air, not hot, but just warm enough to drive back the serum and evaporate the contents of the tubuli to some extent. I then bathe the cavity with a drop of a solution of caustic soda, which is instantly sucked up by the dry tubuli. The soda penetrates the tissues of the tooth to a considerable depth, neutralizing all the acid that may be present in the tooth itself, or in the pad of decay. Again, drying this out and applying warm air as before, I flood the cavity with oil of cloves. Why oil of cloves? I have tried nearly all the germicides that I felt justified in experimenting with, and I find that oil of cloves is the most suitable and efficient.

After absorbing out the surplus with bibulous paper, I again apply warm air. Oil of cloves has the peculiar property when heated to the point of volatility, of penetrating and will pass deeply into the tubuli, and so embalm the substance of the pad that no fermentative action can occur.

I grind my enamel well around to the full extent of the diameter of the cavity that there shall be no overhang to any portion near the surface. I now trim the extreme outer edge of the enamel, surrounding the cavity to the outer bevel, or counter-sink, similar to what is made in flushing a screw head in cabinet work, but not at so acute an angle. All this is done with small carborundum pencil points. Then I line the cavity with balsam, believing that I seal within the tubuli sufficient of the essential oil to prevent the development of any spore or of any fermentative decomposition in the pad. While the balsam is drying, I polish my beveled enamel border.

I think it very essential to perfectly polish enamel borders. I use for this purpose points of hardwood, mostly seasoned hickory and box-wood, sharpened like pencils, held in the porte polisher bits. Running my engine at a rapid speed, I polish the beveled enamel borders of my cavity until my mouth mirror shows me that they shine and reflect light. This is not difficult nor painful, nor does it require much time, but it is very necessary to a perfect operation."

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### Some Mistakes in Crown- and Bridge-Work.

It is always best to contour the crown as nearly natural as possible, and if there is much space on each side of the root exaggerate the contour so as to fill at the occlusal surface.

A common error is to crown a tooth with a living pulp. In the first place a tooth with a living pulp cannot be properly trimmed so as to make the crown fit at the gum line where it should fit, without greatly torturing your patient, and after the work is finished it is only a question of a short time until the pulp dies, then the crown must be removed and repairs made, which is a great deal more work than to destroy the pulp in the first place and fill the root and avoid all this trouble. Then you can trim the tooth so as to make the crown fit.

We sometimes try to have one tooth do the work of two or more, which is very apt to get us into trouble if we do not have some support at the other end. You have probably all seen the ill effects of making a large bridge with one or both ends unsupported, save as it rests on the gum, which must give way in time and cause the failure of the bridge.

Another and quite common and sometimes quite serious mistake is not to have sufficient solder or thickness of gold where the dummies join the pier of a long bridge. It has been my sad experience to be compelled to remove several bridges to repair a break at this point. There is a great strain on a long bridge from mastication and the dummies and piers must be well and thoroughly united to give sufficient strength.

Another error is to use gold of too light a gauge and without reinforcing the cusps in some way and to use too low a karat of solder because you are more apt to burn the gold.

There is no necessity of soldering facings in crown- or bridge-work. They can be riveted and in that way avoid heating and checking the facings. Then the color can be changed by using various colored cements back of them.

In porcelain work we should never allow any of the porcelain to extend over the band, as the film of porcelain is apt to check and pull off and spoils the looks of the work.

It is a mistake to put on a Logan crown or any crown without a band or part of a band unless the root is unusually strong, as there is great danger of splitting the root.

In taking an impression and bite for a crown it is unnecessary to take them separate and is more reliable to use nothing but plaster. After the band is in place mix the plaster as for an impression, then take a little on the end of the mixing spatula and plaster it over the band and adjoining teeth, then have the patient close the teeth and hold firm until the plaster sets, then you have both impression and bite which can be varnished and placed in an articulating frame as any other bite.—DR. B. D. WIKOFF, *Dental Review*.

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### How to Vulcanize.

To successfully vulcanize a rubber piece, the first thing to observe is that the pins of the artificial teeth are absolutely free of wax; then pack the rubber around the pins first, with the greatest care; fill in the palatine surface with sufficient rubber to allow of small excess; provide plenty of gates for its escape; close the flask slowly with clean hot water or dry heat, the latter preferred; when closing the flask see that it is under continual pressure at all times; place the flask in the vulcanizer before it cools; the water should just cover the flask, any more than this is unnecessary; heat up slowly to the proper temperature; allow it to remain at this point, without variation, for fifty-five minutes; cool down and remove. Never allow a piece to remain in the vulcanizer over night. *Dental News.*

## Method of Reproducing Normal Palate and Lingual Surfaces of the Teeth.

The method I have adopted for reproducing on a vulcanite plate the character of a normal palate, and the lingual surfaces of the teeth, is to have two or three suitable models, with a fair thickness of shellac made to fit each one of them accurately. Modelling composition answers the purpose almost as well. Take a piece of wax the required size and thickness, warm it over a Bunsen flame, dust the model with French chalk, and on it press the wax roughly into shape, cutting off all excess. Warm the wax again, and before placing it on the model dust them both once more and press the wax into position with the shellac. This will give an accurate reproduction of the parts. Cut out the palatal portion of the wax denture, and carefully work the impressioned wax into its place. By this method you will be enabled to produce the particular conformation of palate which is best suited for correct enunciation, and to assist in the manipulation of food in the mouth.—A. CROCKER, *Jour. Brit. Asso.*

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### The Use of Cataphoresis in Pyorrhea.

In the treatment of pyorrhea, in order to remove the deposits that are well up under the gums, on the roots of the teeth, I have a copper blade made of wire 16 gauge. I wrap a few shreds of cotton around to hold solution of cocaine, and carry that well up under the gum around the tooth or teeth. I use a pressure of ten to fifteen volts. Each tooth may require two or three minutes. By this method you will find to your delight that you can chisel and scrape away the deposit to the end of the root, if necessary, without any perceptible pain to your patient.

I wash out the pockets with water as hot as patient can endure, after which I sterilize well with pyrozone three per cent., wrapping larger quantity of cotton around blade; thoroughly sterilize the pocket, then take copper blade, dip into full strength sulphuric acid, carry the blade down as far as it will go, aim to touch all exposed portion of root. Make two or three applications on each tooth while treating. The copper blade being readily acted upon at the anode by the sulphide of copper that is set free, of itself has a beneficial therapeutic action.

In making these applications, as you use a much higher voltage, care should be observed to give no disagreeable shock by breaking contact when at high voltage.

It would be best not to treat more than two or three teeth at a time, as they will be sore for a few days. If thoroughly done, it will not require more than two applications.—J. W. CLARK, *in Items.*

## Practical Things in Dental Practice.

In an article on the above subject, in the *Dental Review*, Dr. J. G. Templeton, among other things, gives the following practical suggestions :

### PLACING RUBBER DAM ON LOWER FRONT TEETH.

“ A slip-noose can be put on the lower front teeth with one hand, while the rubber dam is held down with the other ; get the slip-knots ready first, draw them tight, and they will hold as long as wanted.

### TRIMMING RUBBER PLATES.

In finishing plates always trim the rim low over the bicuspids, leaving it high as can be worn over the cuspids and the same over and back of the second molars. Do not file rim to a knife-like edge, slightly bevel inside of rim at the top, extending down about three-sixteenths of an inch.

### TO MAKE PLATINUM GOLD PLATE.

To make platinum gold plate, melt with blow-pipe pure gold on a piece of platinum and roll to the desired thickness ; the result will be as good as any you can buy.

### TO SOLDER CAP ON GOLD CROWN.

To solder a cap on a gold tube intended for an artificial crown, lay the cap on about a tablespoonful of finely cut asbestos, put the tube in place on the cap, drop in the solder and a little powdered borax, then blow a yellow flame all around the tube until the solder flows, and there will be no danger of melting the plate.”

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## Removable Plate-Bridge, Vulcanite Base.

Dr. C. J. Grieves gives the following in *Dental Cosmos* :

These bridge-plates derive their support from normally healthy alveolar ridges, and are stayed in position by the attachment of telescoping crowns, common to all removable bridge-work.

The first case presents well-preserved left central and lateral superior incisors, the roots of the right central and cuspid being in position. Much absorption and hardening of the muco-periosteum and the low attachments of the surrounding muscles made several plates (gold, aluminum, and vulcanite bases), covering the palatal portion of the mouth, almost if not entirely useless. Added to these difficulties was a well-marked nausea on contact of any plate with the palate.

The inferior maxilla retained the four incisors, the centrals of which were much abraded ; cuspids sound, and the right second bicuspid miss-

ing; a healthy root of the right first molar and the left bicuspid in position.

The long-since missing molars and a very decided protrusion of the inferior maxilla had produced a deep abrasion of the front teeth.

The inferior was completed by an extension bridge to supply the missing bicuspid on the right, and a similar bridge supplied the deficiency of the first molar on the left. The remaining root of the molar on right, being healthy and possessing the appearance of having done duty for years, was transformed into a bicuspid by a gold collar-crown. The occlusal surface thus furnished being good, it was deemed unwise to annoy the patient by supplying a partial lower denture.

The superior right central and cuspid roots were sterilized, their apices sealed with cement which was carried down the root-canals, and into which were introduced while hardening two "bright-metal screw-posts," to project slightly beyond the root-walls at the cervix; around these posts, and well anchored into the roots, amalgam was adapted to the contours.

After the hardening of the amalgam, these roots were dressed and trimmed to receive cylindrical caps of platinized gold, 30 gauge. The walls of these caps were made parallel. They were made to fit to a driven joint well under gingival margins, and were set in place temporarily with gutta-percha.

These *primary caps* in their respective positions were fitted by bands of platinized gold, 28 gauge, thus forming *secondary caps*, accurately telescoping. These secondary caps were trimmed to fall a little short at their cervical edges of the gingival margins, and this was further insured by the actual contact of the top of the secondary cap with that of the primary cap.

Occlusal surface being sought rather than appearances, the idea of porcelain fronts for these crowns was discarded. The central cap was converted into an all-gold crown with a heavy incisive edge, and the cuspid into a bicuspid by the addition of cusps. The lip being full and well-bearded, concealed the gold.

These secondary crowns were placed in the mouth, removed in a plaster impression, from which was obtained a sand-and-plaster cast showing the crowns in their relative positions. They were then united at the palato-cervical margins by soldering, from cap to cap, a piece of platinized gold, 25 gauge; this plate stood slightly away from the membranes and, being quite as wide as the caps with extension pieces over the ridges, was perforated to allow free passage for the vulcanite.

The piece being finished and placed in the mouth, was removed in a plaster impression, from which was obtained a plaster cast. On this cast

plain teeth were adapted to the ridge and bite, and the whole piece vulcanized into position.

The bridge-plate now complete and the inner surface of the caps on plate "glyceroled," the primary caps were removed from the roots, cleansed, filled with cement, placed in their respective positions in the caps on the plate, and the whole piece pressed into place in the mouth. The cement was allowed to harden, after which the plate was removed, the glycerol preventing the attaching of both sets of caps.

The case, as then ready for use, presented a bridge-plate readily removed by the patient and entirely free from the complicated detail so usual in removable bridge-work.

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### Copper Sulphate for Pyorrhea Alveolaris.

Sulphate of copper is a most useful agent in the treatment of pyorrhea, and it is also a favorite of mine in the treatment of abnormal swelling of the gums from whatever cause. The gums are dried as thoroughly as possible and the copper applied by means of a piece of orange wood, whittled thin, which is first dipped in water, and passed into the copper, a quantity of the powder will cling to the stick; then pack the copper down between the teeth and swollen gums. You can use it freely. It is not necessary to exercise care as to the quantity of the powder to be used; let it remain there for two or three minutes, then with a syringe of warm water wash the excess away. You will be surprised in the course of two or three days' time, and also much gratified, to see the extent to which the swollen gums have been reduced.—A. H. PECK, *Dental Review*.

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### Economy in Dental Practice.

In an article on this subject in the *Dominion Dental Journal*, Dr. R. E. Sparks says: "Much material may be wasted. It is an easy matter to mix twice as much plaster as is needed for an impression or investment. A case may be waxed much thicker and covering more space than is required for the plate, making a waste of rubber and time in finishing up. Much gold may be wasted in finishing gold plates, crowns or bridge-work. Often much more solder is used than is necessary for the strength or finish of the piece. In finishing gold work, if dry corundum or carborundum stones are used while grinding down the solder and the piece held over a paper or other receptacle, or if wet stones are preferred, or bowl containing water be used to wet the stone

and wash off the piece occasionally, one will be surprised at the accumulation of grindings. The fine sandpaper or emery cloth used for rubbing down gold work and the strips and disks used in finishing gold fillings should be saved and barned and the ashes preserved. Sheet wax may be easily and economically made. Quite a saving of gas may be made by watching carefully the heaters and waxing burners. It is quite possible to make the gas bill what it need be. Great waste may be made in the careless mixing of cement and amalgam. One not infrequently sees more cement remaining upon the mixing slab, or more amalgam upon the bracket, after the operation than was used in the fillings themselves. All amalgam scrap should be saved, as it is easily refined and recut. Sweepings of the operating room and laboratory could profitably be kept, as they are readily bought by the refiners. I have heard of old carpets off operating rooms being sold for more than enough to purchase new ones. I have never been able to negotiate an exchange so favorably. Possibly because I have my carpet beaten twice a year; but I have often intended having it rolled up and opened out upside down upon sheets and so beaten, to preserve the gold finished off fillings; I feel that it would be a paying precaution. Rubber dam which has become too full of holes to make it safe to use, may be made as good as ever by patching the holes with a little of itself rubber cement. Towels used for protecting the patient's clothing are worn out more by laundering than by use. They may be used much longer without being laundered if, instead of wiping our instruments upon them while operating, we wipe them upon a mouth napkin, which answers every purpose and which costs relatively nothing. In the use of nerve broaches we may be extravagant. With care the one grade will answer about as well as the other. But whatever grade we use we may destroy many more than are necessary. In ordinary cases one broach will remove several nerves before the barbs are stripped off, if it be only used for the removal of the nerves. As soon as it has done its work it should be cleansed and laid away for another time, and others which have lost their usefulness as extirpators may be used for washing out the canals, and when they have become so smooth as to refuse to hold a twist of cotton, they may have their points snipped off and be further used for nerve canal pluggers.

That pet ligature, floss silk, may be replaced by gilling twine, of which we may buy as much for 50c. as of the former for \$5. When using a ligature it is usually required upon three or more teeth. We are directed to prepare one for each and tie a knot to go on palatal or lingual side of the tooth, to prevent the rubber from slipping off. Prepare one ligature; knot it if you wish, tie it on one tooth, cut off the ends close to the tooth, tie the ends together and proceed with as many teeth as it

is necessary to ligate. It is profitable to purchase time-saving instruments and devices, but let us not buy everything that is offered for sale, or we will find our laboratory and closet shelves loaded with rubbish only to turn up at house cleaning time. Thus by a little care and attention all the way along the line, and we have only taken time to mention a few representative points, we may make the expenses of the dental practice about one-half what it may be by carelessness and extravagance."

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### Method of Operating.

Gold cylinders, the length of which correspond to the cross-axis of the cavity, are laid on the bottom and sides and pressed to place by bibulous paper folded once, or as many times as will correspond with the work in hand; and soft linen cut into strips is to be used in like manner without folding, and in its preparation must always be cut, never torn. After the gold has been pressed to place under paper by "plugging pliers" (a special form is best), the ends of the cylinders are *turned over* and *around the cavity, between the tooth and the matrix*, or the first cylinders may be placed and adapted under the bibulous paper, the edges of these turned over the border of the cavity at the cervix, and the matrix then applied as described, pressing against the cylinders, the operation being continued by the use of mat gold and malleted to place with the paper upon the gold, followed after its removal with proper small, smooth points until all parts of the boundary, as you progress, are filled *without the instrument coming in contact with tooth-structure*. After the enamel has been thus protected, to a greater or less degree, not being so essential as with dentine, the cohesive gold can be added wherever the masticating surface or contour occurs.

When one or more of the walls are broken, a matrix becomes a necessity, and here planished copper or German silver works best with me—always fitting it to the individual case. This may be done by soft soldering the ends or using the silk ligature, which I generally prefer, winding it round and round the matrix to its width, which comes to the bulbous portion of the tooth only. To planished copper, which is rendered so pliable and dead by annealing, I give the preference for making all kinds of matrices.

This method of operating, I believe, is in direct line with the latest discovery in histological research in its relation with the several anatomical parts of tooth-structure, both mechanically and physically related, and as a protection from the microgerm environment. Thus do we find non-cohesive or soft gold laid in lamina in juxtaposition against dentine

and enamel, in contradistinction to small pieces being added cohesively in retainers, to be no veneer, but of better grain, and being opposite in all its relations as a tooth-preserved, both physically and mechanically.—H. C. REGISTER, in *International*.

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### Linen Thread for Regulating Teeth.

In regulating teeth you often find the superior central incisors standing apart, especially where the lateral incisors are out of the arch. If you have a case of that kind in your practice, if you will go home and dry these teeth clean, then take No. 25 linen thread, wrap it carefully around the teeth three or four times and tie it, you will be surprised to find those teeth are together the next morning, or at the end of twenty-four hours. The philosophy of it is simple, the contracting of the wet thread brings the teeth together. It is the best method I have ever attempted in cases of this kind. The teeth, if they do not remain together, can be made to do so by making little bands, soldering them together, cementing them on the teeth, and you will have no further difficulty.—G. D. SITHERWOOD, *Dental Review*.

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### Treatment of Root Perforation.

I have used paraffin for perforation near the apex of the root. It has the virtue of easy removal.

One difficulty of treating these cases of perforation near the apex is the sterilization and filling of that portion of the canal which lies beyond. There is always a doubt as to the condition of this apical portion of the canal. The first thing to do with a perforation is to diagnose it. The cases that I have seen have occurred in consequence of the lateral cutting of reamers which were not held in the axis of the tooth. A fine probe passed towards the apex causes pain and immediate hemorrhage. I have pursued the following method: A gutta-percha cone is introduced, and its point cut off, until no sensation is produced, when it is placed in the canal. This is coated with thick chloro-percha, and slowly but fully introduced; however, it had better be too short than too long.

For the large lateral perforations I use a plaque of gutta-percha. In one case of perforation with an external fistula overlying it, I pressed back the soft tissue, exposing the perforation through the gum; then placing a gutta-percha cone in the canal, I treated the perforation as a cavity, filled it from the exterior with facing amalgam. The wound healed and the tooth is now doing good service.—DR. INGLIS, *Internat'l.*

## B R I E F S .

**To Keep Flasks Clean**, when vulcanizing, put a small quantity of washing soda into the vulcanizer.—*Pac. Journal*.

**Phosphoric Acid for Stains**.—In extreme cases, where the stain is *very* persistent, I moisten the polisher with a drop of dilute phosphoric acid with much advantage.—*A. H. Brockway in International*.

**Gutta-percha** which has become brittle by the action of light or air can be rendered serviceable again for many purposes by softening it in warm water and remoulding it; but it soon exhibits a tendency to crack.

**Chloride of Sodium** added to the warmed water used for removing the loosened carious fragments during the process of excavating a cavity of decay does much to mitigate odontalgia before the introduction of anodynes.—*Pac. Journal*.

**A Warning Against the Use of Copper Amalgam**.—Placed in the crowns of pulpless teeth, it will certainly discolor the crowns if no impermeable layer be interposed between the filling and the dentinal walls.—*Dr. Darby, International*.

**When to Administer Cocain**.—Patient bears the administration of cocain much better early in the day, and after a hearty meal, than later on, when tired out and when several hours have elapsed since the taking of nourishment.—*Dental News*.

**Cinnamon Oil Should Not be Used in Anterior Teeth**.—Ceylon cinnamon oil has a tendency to stain. Although the stain is very light, it is liable to affect the color of an anterior tooth, and for that reason I do not use it there.—*Dr. Rhein, in Items*.

**For Mending Punctures in Rubber-Dam**, make a cement by dissolving old dam in chloroform and use with a patch of dam applied over the puncture. If the cement is applied on both sides of the patch the tendency to curl up will be avoided.—*Pac. Journal*.

**Instruct Patients**.—It is most important that we should thoroughly teach our patients how to keep the teeth clean, for this we know is the most efficient means of preventing decay, and we should explain to them the reason why.—*Dr. Lord, International Journal*.

**To Remove Grease and Dirt from the Hands.**—To remove black grease from the hands after handling flasks, use as small quantity of spirits of turpentine. Rub this well all over the dirt, then wipe with dry cloth, then use soap and water. After drying, use vaseline or glycerine.—*British Journal.*

**Essential Oils and Chloroform.**—In the use of oil of cloves or cassia always dilute them with chloroform for the purpose of dissolving the greasy infiltrations in the diseased tissue as well as absorbing the moisture thus allowing the anodynes to come closer in contact with the painful tissue.—*Pac. Journal.*

**To Make Gold Cohesive or Non-Cohesive.**—Any of the non-cohesive foils, with one exception, which is not a pure gold foil, can be made cohesive by continued annealing, and all of the cohesive foils without exception, can be made noncohesive by exposing them to the fumes of ammonia.—*J. E. Nyman, Dental Review.*

**Powdered Arkansas Stone for Cleaning Teeth.**—In place of pumice-stone I use Arkansas stone powder, which gives a fine finish and removes the discolorations and deposits much more effectually, in my opinion, than pumice-stone. It can be obtained from any of the jeweller supply-stores.—*Dr. Houghton in International.*

**Keep Matches Away from Gold Foil.**—Matches should not under any circumstances, be kept in the dental cabinet, as the phosphorus fumes arising from them may seriously affect the working of our gold foil; and even when we have occasion to strike a match, it would be better to have all foil under cover.—*Dental News.*

**To Test for Vitality in Root-Canals.**—A common mistake often made is testing for vitality in root-canals with a broach rolled with lint or even a close fitting broach. Such becomes a piston with a column of air which may press so severely upon the terminal end of nerve at apex as to inflict violent pain.—*E. S. Chisholm, Dental Review.*

**Keep Mercury Out of the Dental Cabinet.**—The chamois skin and pliers used in squeezing out excess of mercury from amalgam, as well as the mercury itself, should not be kept in the cabinet. The observance of these simple precautions may save a great deal of worry and trouble in inserting and finishing gold fillings.—*Dental News.*

**Dirty Mouth-Mirrors.**—Did you ever think how it would repulse you to have a mouth-mirror which had been removed from another patient's mouth and not cleansed, thrust into your mouth? Then always cleanse your mirror *in the presence* of your patient. Most patients are too polite to say anything, but they do a great deal of thinking.

**Method of Applying Zinc Sulphate.**—Use zinc sulphate in the treatment of pyorrhea, after thorough cleansing of pocket and roots. Warm beeswax in warm water and incorporate zinc sulphate to form a paste, with which pack the pockets and leave several days. As the pockets fill in with granulations from the bottom the plug is forced out.—*British Journal*.

**How to Heat Gutta-Percha.**—Instead of the method so frequently employed of heating gutta-perch held in the pliers over the alcohol flame, use a disc or slab of porcelain; place it in contact with the heat of the flame; put your pellets of gutta-percha on this, and when sufficiently soft to be kneaded, work with cold instruments into the cavity.—*Dental News*.

**Cataphoresis.**—I find cataphoresis is very satisfactory in obtunding the gum where you desire to lance an alveolar abscess in cases where a tooth has been extracted and the remaining socket is very painful to the touch and does not heal readily; and if you have an exposed pulp, you can apply your cataphoresis to that pulp and obtund it in a very short time.—*Dr. Hungerford, Western Journal*.

**Keep Amalgam Instruments Below Gold.**—Amalgam instruments should be kept below, rather than above, where gold and instruments used for working it are located; for in being kept above there is possibility of small particles of mercury adhering to the amalgam instruments becoming detached and falling in the compartments below and there lodging upon gold, pluggers, etc.—*Dental News*.

**The Treatment of the Artificial Gum** is deserving of greater attention from an esthetic standpoint than it receives. It ought as far as possible to be carved and shaped after the form of the natural gum, especially where there is the least chance of any portion of it being visible, and further wherever any restoration would be an improvement do not hesitate to make it.—*A. Cocker, Journal Brit. Assō*.

**Electro-Sterilization.**—The method which I have adopted is as follows: After the end of the tooth has been sealed, if I want to use chloride of zinc, I first fill my canal with a solution of pyrozone, and add to that a small amount of chloride of sodium; then I place the zinc wire in this moistened canal, and there is absolutely no necessity for adding any more solution afterward, because the canal is thoroughly moistened.—*Dr. Rhein, in Items*.

**Making Mirrors.**—A sheet of tinfoil is placed on a perfectly level table and covered with mercury; the glass is then slid on the mercury

with care to prevent air bubbles from forming; the superfluous mercury is drained off, and the glass left under even and heavy pressure for several days; it is then lifted and placed to dry, with the silvered side uppermost. There are various processes by which mirrors are made without the use of mercury.—*Welch's Monthly*.

**An Inverted Tooth.**—B. Fraenkel recently showed at a meeting of the Berlin Medical Society (*Deutsche Medizinal-Zeitung*) a boy who had syphilitic caries and necrosis of various bones of the nose, with perforation of the soft palate. In the extraction of sequestra from the nasal passages a piece of bone had been encountered that seemed absolutely refractory to the saw. It has turned out to be an inverted tooth with its entire crown distinctly visible above the floor of the nose.

**How to Use a Reamer.**—When reamers fail to clear themselves, it is best to stop their use, and clear away the debris, rather than to attempt to force the reamer through this, as frequently this debris gets packed into the canal so hard as to divert the reamer or drill from its true course, making a change of direction and resulting in the perforation of the root, and this frequently before sufficient depth is attained for the dowel.—*Office and Laboratory*.

**Solvents of Gutta-Percha.**—Gutta-percha is completely dissolved if the ether is free from alcohol. Ether, to which some alcohol has been added, loses the property of completely dissolving it. It is, however, readily dissolved in bisulphide of carbon and chloroform, and, by the application of a mild warmth, also in benzine, the fugitive coal-tar oils, oil of turpentine, and the oils which are obtained from the *dry* distillation of rubber and gutta-percha.—*International*.

**Extractors and Sixth-Year Molars.**—Let me say to those who extract "to give room," aid nature and let "interlocking articulation" be your guide. Extraction for crowded arches should be a thing of the past. More attention should be given the sixth-year molars and their proper relation with each other, and if *that* is secured at an early date, crowded arches will become manageable and fewer deformed faces will be the result.—*W. S. Davenport, International*.

**Listerine.**—As a standard antiseptic, Listerine takes a wider scope than any pharmaceutical product now in use. There are other preparations of merit, but, as a rule, they require to be used with great discrimination in order to prevent toxic effects. Listerine, on the other hand, can be used with equal safety—internally and externally. Its uniformity of composition, efficiency and safety in use, have rendered it a necessary part of equipment for every household.—*Med. Brief*.

**To Prevent Accumulation of Tartar.**—I have been using a solution of alum to prevent the accumulation of tartar; over a dozen patients have tried it, and I have been surprised at the excellent results. I tell them to take a glass of water with a pinch of alum in it, and rinse the mouth freely once a day. It is harmless to the teeth, and has kept the gums in good condition, where previously there was a heavy accumulation every month or six weeks.—*Dr. Peirce, International.*

**The Double Character of the Motor System.**—Recent physiological investigations have shown that the motor system is double throughout the body, consisting of two sets of nerves, one of which has the power to annihilate the function of the other. These nerves of opposite function sometimes follow different anatomical tracts, though they are often united in the same nerve-bundles. The vagus has been shown to be both an inhibitory and a motor nerve of the lungs.—*Modern Medicine.*

**Application of Nuts to Screw Threads.**—Now, there is another point in the application of nuts to the screw threads: in the mouth in front, where the tongue is liable to come against the nut, or on the side used in chewing, you will very often find that the tension of the nut is released by the movement of the teeth. The way to obviate that is to take another nut and put it on top of the first, and whenever you make a movement of the first nut, draw the other nut up against it, and then you have the first nut secure.—*Dr. Shultz, West. Dent. Journal.*

**Bridge Attachment.**—Dr. T. S. Waters spoke of the process of fastening the abutments of a bridge to the roots of teeth by cementing cylinders in the canals and fastening the bridge on with split pins in the cylinders, to which were soldered caps which were swaged over the crowns of the teeth. In the construction of bridges his aim is to make the bridge so the mouth will be kept in as hygienic a condition as possible, and he uses the alveolar process as a support for the bridge. In doing this, allowance must be made for the shrinkage of the gums.—*Cosmos.*

**Diffusion of Current for Cataphoresis.**—In many of my first cases, I found great difficulty in producing complete anesthesia of the entire area. For instance, in a large crown and approxiinal cavity I would find the surface directly under the current would be cataphorized, and other portions would not be affected at all. In the mouths of two or three patients, where I had difficulty of this kind, I placed over the cotton a layer of pure tinfoil, and putting the point of my electrode on and using the current in the same way, I got perfect results in less time.—*F. T. Van Woert, in Items.*

**Thin Finishing Strips.**—I have some very thin finishing strips that have been useful to me, and I have brought them along as samples. I suppose many of the gentlemen have used them; they are made of architect's tracing-cloth. In finishing amalgam fillings, before the amalgam is set, they are extremely convenient. I have also found them convenient for polishing. I get a yard or two of the architect's tracing-cloth, which may be obtained at most stationers', and get my printer to cut it for me. I have never come across anything as thin as this material with as much strength.—*F. M. Smith, International.*

**Anesthetic for Extraction.**—I have been using lately for extracting teeth and for the extirpation of pulps a preparation consisting of 3 per cent solution of pyrozone and aqua destillata *aa q. s.* or peroxid hydrogen in place of pyrozone.

Its action is on the pressure theory, of course, but produces an immediate whitening of tissue and insensibility lasting for several minutes, no sloughing afterward. In cases where abscesses exist, and they are injected, sometimes the immediate and intense pressure causes some pain but not always.—*W. E. Griswold in Dental Review.*

**Silver-Nitrate Carrier.**—One word in regard to carrying powdered nitrate of silver on gutta-percha to a sensitive dentine surface. The base plate gutta-percha is the proper kind to use.

This should be rendered aseptic and softened by first dipping it into eucalyptol and then passing it through a flame and repeating the operation, if necessary, until the gutta-percha is quite soft enough to not only pick up the nitrate of silver powder, but also to be readily adapted to the sensitive surface of dentine, to which it will readily adhere and may be adapted with ease providing it is carried into the cavity on a piece of asbestos, which is left external to it.—*J. C. St. John, Review.*

**Crown Without a Band.**—Prepare the root by grinding concave labially, to the middle of the root, slanting upward and backward to the palatal. By this preparation the danger of splitting the root is almost as if it were banded. Take an impression in heavy platinum foil, trim to the size and shape of the root, then push the post through the foil into the root and solder. Fit and solder the facing and bake porcelain to fill in and contour the back. After the case is baked remove the platinum foil, since it merely serves as a matrix to bake the porcelain the proper shape. Those who do not use this style of crown can appreciate it only by seeing it as applied to a case in the mouth.—*G. W. Schwartz, in Dental Digest.*

**An Anesthetic for Pulp Extirpation.**—A compress placed upon the needle of the syringe, extending up to the part injecting the pulp

with the solution, renders the extraction of it absolutely painless. Immediate root filling after this process can be accomplished. In the extraction of teeth the injection I find is rather painful in most cases, but if properly done extraction is painless.

My formula :

Pyrozone, 3 per cent.	aa	5 ss.
Aqua distilat		
Olea cassia	aa	m.iii.
Acid carbol		

—C. P. Lennox, *Dental Review*.

**A Useful Anodyne.**—Add one part of phenol crystals to three parts of menthol and melt the substances. It is a fluid, of pale amber color and aromatic odor, very pungent in taste, but is not a caustic. It dissolves readily in alcohol, ether, chloroform, and most oils, and is a solvent of iodoform and aristol. High antiseptic properties are claimed for it, while it undoubtedly possesses decided analgesic qualities. Dr. Schaeffer suggests a solution of two drops to an ounce of water as a mouth-wash. He has treated successfully, with a three-per-cent. aqueous solution, phagedenic chancroid ulcers, mucous patches of a syphilitic character, and erysipelatous suppuration of glands.

I made some of this a number of months ago, and have found it especially valuable in application to aching pulps.—*J. H. Howe, International.*

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### Obituary.

DR. E. MAGITOT.

THE Odontological Society of Chicago, recognizing the great services rendered by Magitot to the advancement of dental science, has adopted, and ordered sent to the family of the deceased and to the dental journals of the United States and France, the following :

Magitot was born in Paris, in 1833, and died there during the current year. His first contribution to dental literature was made in 1857, at the age of 24, relating to the structure and development of the human teeth, while the last came from his pen in 1897, just before he died. During these forty years Magitot wrote no less than sixty-five books, essays, pamphlets, etc., dealing exclusively with nearly every phase of dental embryology, histology, biology, pathology, hygiene, etc. No writer, of

any age, has made as many, as varied and as valuable contributions to dental science, as Magitot.

The priceless services rendered by him, entitle him to rank as one of the foremost investigators in odontology. He was a member of numerous scientific bodies and societies, whose members sincerely mourn his loss. It may be truly said, that when Magitot passed away from the scenes of human activity, dental science, not of France alone, but of the entire world, lost one of its noblest and greatest minds.

The dental profession of the United States recognizing and appreciating Magitot's services, keenly mourns and sympathizes with his bereaved family and the profession of France, by reason of his demise.

CHICAGO, September 1, 1897. A. W. HARLAN,  
J. W. WASSALL, } Committee.  
LOUIS OTTOFY,

## OUR AFTERMATH

MASTER OF ARTS.—The honorary degree of Master of Arts has been conferred upon Dr. C. N. Johnson, Chicago, by Lake Forest University. It is an honor well bestowed.

OHIO STATE DENTAL SOCIETY.—Do not forget that the State Society meets in Columbus at the Neil House, Dec. 7, 8, 9. It will be an unusually interesting meeting. Everyone welcome. Be sure and arrange to go.

MARRIED.—Dr. Weston A. Price, of Cleveland, and Miss Florence Anthony, of Brampton, Ontario, were married at the home of the bride's parents, on Thursday, Oct. 14th, 1897. Their future home will be 704 Republic St., Cleveland, O. We extend hearty congratulations.

A SOUVENIR—We acknowledge receipt of the souvenir issue of *Items of Interest*, containing a full report of its "mountain meeting." The book is well printed on extra fine paper, and bound in cloth in white and gold. It makes a very creditable appearance and shows the enterprise of its editor and publishers.

**DIED.** — Dr. C. H. Scott, died at his residence in Zanesville, O., on Friday, September 24th, apoplexy being the immediate cause of death. He was born in Steubenville, July, 1840, was a graduate of the Philadelphia College of Dental Surgery. Dr. Scott had been in the practice of dentistry in Zanesville for more than 25 years. He was a member of the Presbyterian church, a faithful worker and good christian. A wife, four brothers, and three sisters survive him.

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## CONTRIBUTIONS.

### A New Method of Casting Metal Dies.

BY WM. H. STEELE, FOREST CITY, IOWA.

WE have all been there, and know the difficulties to be overcome, in order to obtain a perfect metal die of a badly undercut, rough model; cores, sectional flasks, etc., are all good as far as they go, but fall far short of being a universal success. I have been experimenting for several years in order to find something better, and this method I present you as the result of my experiments; it does away with all the dirt and disagreeable odor of the sand process, and a perfect metal die can be easily cast from the most difficult case. The dies are sharp, smooth and perfect, and several can be cast from the same mould if desired.

#### MATERIALS FOR THE WORK.

A good smooth plaster model, a jar of paste, fine Spanish whiting, fine powdered chalk, a medium stiff flat brush for paste, a very soft brush for soap stone, stereotypers backing paper, filling tissue No. 1 extra white, facing tissue No. 1 extra cream, and some smooth heavy tea-lead.

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The editor and publishers are not responsible for the views of authors of papers published in the **OHIO DENTAL JOURNAL**, nor for any claims that may be made by them.

## TO PREPARE THE PASTE.

Take  $2\frac{1}{2}$  oz. of rye flour,  $3\frac{1}{2}$  oz. of starch, a  $\frac{1}{2}$  teaspoonful of powdered alum and 2 quarts of soft water, mix together thoroughly; then add cold water and mix until the mass becomes the consistency of thick cream; then gradually add the remainder of the water, which must be boiling hot, stirring well to prevent lumps; continue stirring until it begins to boil, then set off to cool; when cold strain through a fine sieve or cloth, when it should look like jelly. When ready for work add Spanish whitening until thick enough to spread with paste-brush.

## TO MAKE THE PAPER MATRIX AND PLASTER MOLD.

When the plaster model is fully set go over the entire surface with the soft brush and soapstone, rub with the finger to remove surplus and give a gloss to the model. Cut a piece of the heavy backing paper large enough to entirely cover the plaster model; also, cut from two to five pieces of the No. 1 white tissue, same size, for filling, (the rougher the model the more sheets will be needed to make a smooth matrix); also, a sheet of the cream tissue facing paper and a piece of sheet-lead the same size of the paper. Soak the piece of heavy paper in water, dry off the surface with blotting paper; coat evenly with paste and apply a sheet of the No. 1 tissue; continue with the paste and paper until the requisite number of sheets have been built up; paste on a sheet of the cream tissue-facing, being careful to avoid wrinkles. Now dust the surface with a bag of fine powdered whiting; oil the plaster model lightly and quickly apply the prepared paper, smooth face to the model; beginning in the center smooth down snugly to the model. Now cut a piece of the tea-lead large enough to entirely cover the paper, press it down into the center of the arch, slit wherever necessary to avoid folds or wrinkles being careful to have it hug the paper closely all over; oil the lead, place in the casting ring, and pour with plaster. If the plaster mould is to be removed in sections, to avoid an under-cut, pour it with this object in view, making guides where it is necessary so the parts will fit together accurately.

## DRYING THE MODEL AND POURING THE DIE.

When the plaster is hard place it in the drying-oven for a few minutes—model side up—until the paper matrix is hard

enough to separate; then remove the plaster model. Now wet the top edge of the paper matrix and plaster mold; mix plaster thin and build all around the edge to prevent the paper drawing away from the investment when pouring. Place the prepared mold back in the oven and when the matrix becomes hot pour the metal. Use good clean metal, do not have it too hot and the result will be a fine, clean-cut, smooth die.

In conclusion: To ascertain the right heat for pouring, fold a piece of the white paper and dip into the ladle; if it comes out black the metal is too hot, if straw color it is just right. Be careful that the matrix is dry and warm before pouring; otherwise, the metal is liable to fly or the die be faulty.

The oven I use for drying the matrix is made of Russia iron and has an aluminum cover, and is very useful for drying investments, packing vulcanite, etc.

In ordering the paper for this work it is necessary to specify stereotypers' for brush-work. I have been buying mine from B. O. Myers & Co., N. Y.

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### Combination Fillings of Gold and Cement.

RY S. B. PALMER, SYRACUSE, N. Y.

THE above subject has been introduced to the profession for several years past, and still there remains enough in its favor untold, to be of interest to the younger operators. I have made it quite a study and will add my conclusions, with directions in detail, which, if followed closely, will enable any one to obtain uniform and positive results. Success with me lies in the preparation of the gold used. Out of the many preparations on the market, some of which may be equally as well adapted to other conditions, none other could take the place and meet the demand for Watts' crystal gold, No. 1—"old form." To meet other requirements, this gold is now put up in "strips, cubes, sliced," and the old form, a single cake sliced; crystal gold being cut from a cake. For the filling under consideration, it is far better to cut from the cake as needed. A slice of any thickness can be cut from the end of a cake with a razor or any blade equally sharp, without condensing in the least. And in like manner the slices can be cut in squares, oblongs, etc., as best adapted to the cavity.

Leaving the gold for the present, we will consider three forms of cavities, and no more in this connection.

First, very shallow, buccal or labial. I find some barely through the enamel, so that on the oral teeth the bottom of the cavity is convex, like the original form of the enamel; such cavities need not be deeper than a visiting card. Let the margins be at right angle or slightly undercut, no matter what form the bottom of cavity is after decay is removed.

As the same principles are involved in filling the other cavities to be mentioned, let us finish filling the first.

The cement should be such as is best for crown setting. The mix should be somewhat thinner, and be carried to the cavity upon the point of the spatula or a thin pointed instrument. The gold slice for the first layer should be about the thickness of a dime, and cut to more than cover the cavity, and be annealed on mica or metal, at a low red heat.

The instruments used have much to do with the success of this work. They should be light shanked, oval faced, and finely serrated. It is not necessary to procure a new set, as some good ones can be made by grinding to size the flat oval ends of plug finishing files, those of slender shanks, using lateral pressure; for direct pressure, ordinary instruments answer. I find that hand pressure is most reliable throughout.

Having prepared the cavity and protected it against moisture, coat the surface with cement; remove surplus, if any, with the point of a stick or otherwise; cover the orifice with the gold and gently press it down in the center, working towards the margin, so as to force out the cement; wait two or three minutes and remove the upturned overlapping gold, which has served the purpose of preventing the cement from contact with the gold lining. Clean the enamel border from gold and cement, and apply another layer of gold, which may be as thick as a small penny; condense as before. On reaching the enamel, turn the overlap in, and condense to fill the depression at enamel border; possibly an addition of gold may be needed. The foundation is ready for filling with foil, or finish with the same.

If foil is used, let it be in flat folds of not more than four layers of foil. Fillings of this kind show no dark line around the border, and do not drop out.

Cavity No. 2. Located in any position where it seems de-

sirable to use cement for a part of the filling, or to use the gold as a facing and protection to cement. This combination embodies two opposing principles, which greatly annoy operators of little experience. First, gold to adhere to cement must come in contact while the cement is sticky; second, cement is not a firm foundation for gold, unless there is adhesion.

Instructions are given to introduce the cement, and before it hardens pack the gold and wait for hardening. I have been unable to get a good gold foundation; some of the cement usually covers or becomes mixed with the gold, so that there is not as much cohesive surface between the gold foundation and the filling proper. Fill the cavity with cement, as would be done for an entire plug, remove surplus and shape the surface of cement to meet requirements. By this time the filling will have hardened, so as not to flow under pressure. Make the second mix as described for No. 1, and conduct the operation as already described. Any gold may be used to finish.

No. 3 represents a cavity that has been filled with cement, which from wear or for a more permanent filling gold is desired. Prepare the cavity by leaving such portions of the cement as may be covered with gold. Experience teaches that cement does not adhere closely to an old filling, also that there is not much adhesion between gold and hardened cement. To harmonize this difficulty, cover the foundation with a thin mix, upon which anchor the gold, as already described, and complete the plug with foil. It is surprising how thin cement penetrates the crystal gold, also how firm the gold is cemented to the dentin. Seeing is most convincing. Take a piece of ivory or bone, file a surface flat, paint it with cement and press upon it a layer of gold, and see what a beautiful surface the gold has, and how firmly it adheres to the bone. By this means one can see just how thin the layer of gold is. Take a slice as thick as a dime and press one-half, leaving the other, and it will be found that the packed gold will not be much thicker than paper. Trusting that some reader may be aided by following the above instructions, I leave it for trial.

**A Method of Crowning Broken-Down Teeth.**

BY C. J. HAND, D.D.S., ROMEO, MICH.

In crowning badly broken-down teeth, or where devitalizing the pulp is not expedient, or is objected to by the patient, as in short laterals or denuded teeth, I have found the following a very good plan: After trimming, so that band can be *accurately* fitted, make a band of *thin* platinum, to cover all exposed portions of tooth, and solder with pure gold. (Of course it is supposed that the labial wall has been beveled as much as possible, to permit the facing being brought in line with the adjoining teeth). Instead of using a thin facing, secure a Bonwill crown, one that will nicely fit the space, and grind out the lingual portion, leaving the sides intact. Grind until the tooth can be placed over the platinum cap in proper position. It can now be waxed to the cap, invested, and body added to restore form, or better still, a little body mixed thin and placed on the porcelain and platinum cap, gradually raising the heat until fused. This method not only saves time, but prevents the investment absorbing the water in body and causing a porous bake. The crown is much better than a facing, as it prevents the difference in color at sides, which it is almost impossible to prevent when body is added to a facing. If care has been used, the crown will go to place accurately and present a very natural appearance.

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**Practical Suggestions.**

BY DR. H. B. HINMAN, BUCYRUS, OHIO.

## SILVER NITRATE.

WHERE the cavities are not in an exposed position a 50 per cent. solution of silver nitrate may be applied to the cervical border of mesial and distal cavities in molars and bicuspids, and will do much toward preventing decay at that point. By means of a few shreds of cotton on a broach, it may be applied without staining any other portions of the tooth.

## CAVITY LINING.

For lining deep seated cavities, where it is necessary to leave a portion of partially decayed dentine to avoid exposing the pulp, I combine equal parts of iodoform and zinc oxid and mix with the phosphoric acid. I have never, to my knowledge, had a pulp die under a filling where the cavity was lined in this way.

## BROACH HOLDER.

I noticed an article in one of the dental journals recently, which advocated the cutting off of the Donaldson broach in the middle and affixing a ball of soft solder to the end of it, in order to reach the anterior roots of lower molars and the buccal roots of upper ones. I have been doing practically the same thing for some time, but use sealing wax instead of the solder. It is easier to put it on and gives a better grip to the thumb and finger for rotating.

## THE USE OF VARNISH WHEN SETTING CROWNS.

Gilbert's antiseptic balsam varnish applied to a Logan crown and pin and also to the stump of the root and root canal, before setting, greatly assists in the retention of the crown.

## REGULATING BANDS.

To make regulating bands for children's teeth, punch holes in a piece of heavy rubber dam with the largest hole in the Ainsworth punch and then trim around the hole the desired width.

## A USEFUL ADJUNCT IN TAKING THE BITE.

For taking the bite in partial lower plates, a piece of jewelers' soft solder, which comes in small half-round bars, will keep the wax from breaking and when wax is flowed over this, it will be just about the proper thickness for the plate. It is also soft enough so that it can be somewhat bent.

## Practical Hints.

BY A. B. CRAWFORD, GRAND RAPIDS, WIS.

## MATRICES.

FOR matrices I have long used the thin sheet copper from an old electric dynamo brush, and find matrices made from it not only excellent but cheap.

## ROOT FILLING.

Clean canals as well as possible, then fill carefully with anything that will make a tight filling and at the same time be a non absorbent, antiseptic and non-corrosive. Very thick solution of gum sandarac is good in some cases.

## RUBBER-PLATE FINISHERS.

Perforate corks of different sizes, screw on to brush mandrel of lathe and turn to shape desired.

Cut required grit of sandpaper into half inch strips, wind around the cork, then wind base end with string and twist ends together and fasten by forcing them into hole in the cork with the mandrel as it is screwed to place. By using this system and a little ingenuity a file is seldom required, and the work is quickly done. After polishing with felt wheels and cones with wet pumice, soap a stiff brush and load it with pumice for the final finish all over.

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## Tincture of Benzoin.

BY T. S. SEELEY, D.D.S., NORWALK, OHIO.

MUCH has been said about the use of aconite and iodin in the treatment of inflammation tending to an abscess. While they are as good as ever and fill their place well, I desire to recommend the comp. tincture of benzoin used about the same way. Place a drop on the dry gum and cover with a pad of dry cotton, allowing it to remain from one to twelve hours. Or, in severe cases, saturate a capsicum plaster with the tincture and apply to the dry gum.

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## How to Remove a Pulp.

BY W. C. KERNS, D.D.S., SIDNEY, O.

In removing pulps in the anterior teeth, expose the nerve, then lay a crystal of cocain directly over it, care being taken to first adjust the dam, and in a few minutes you can take a nicely sharpened stick of orange-wood and with a quick tap of the mallet drive the point nearly to the apex of the root, withdraw, and frequently the nerve will come away with the pin, if not, remove with the broach. If carefully done you will cause no pain.

## Amalgam and Cement as a Combination Filling.

BY F. W. KNOWLTON, D.D.S., AKRON, OHIO.

IN cavities in the bicuspids and molars in teeth below medium in texture, we are led to believe that both from a theoretical and practical point of view, there is no filling that proves more successful for the comfort of the patient and the preservation of the tooth than amalgam and cement in combination; provided, the same care and attention is given such work as is necessary in all operations pertaining to filling. In this combination the more desirable properties of each material are retained and some of the undesirable ones eliminated.

The cement lining the cavity gives perfect adaptation and prevents any discoloration of the tooth, while it supports the walls better than any other filling and to some extent cements the filling to the tooth. The amalgam by completely covering the cement prevents the cupping and wearing out as in a filling of cement alone and makes a permanent out of an otherwise temporary filling. While there is nothing new or original in this or the manner of procedure, the results are so satisfactory that such work merits a more general use in the teeth designated than is usually given it.

The manner of inserting such a filling may be worthy the attention of some who are not familiar with the same in a practical way. The cavity is prepared in the usual manner, not depending wholly on the cement for holding the filling in place when there is any strain on the filling during mastication. If the cavity comes in close proximity with the pulp, a thin piece of asbestos paper cut the proper size and one side covered with an antiseptic varnish, should be placed over the pulp, the varnish holding the paper in position and assisting to protect the pulp from any deleterious influence the cement might have on it. Place the powder and liquid on the glass slab and roll a small pellet of cotton very tight so there will be no loose shreds of cotton remaining. Mix the amalgam as usual and wafer a portion of it. Now mix the cement a trifle thinner than for a cement filling and place a small portion in the cavity with the spatula and taking the previously prepared pellet of cotton in the pliers spread the cement against

the walls of the cavity with a single pressure; if done quickly it will cover the cavity nicely and not stick to the cotton. Now place some of the amalgam in the cavity and with ball burnisher work the amalgam into the cement, at the same time working the surplus cement to the margins of the cavity when it must be thoroughly removed with excavators so there will not be a particle of cement left exposed when the filling is completed. Fill the remainder of the cavity with the wafered amalgam and finish as if it were an ordinary amalgam filling.

### Bactericidal Action of Electricity.\*

BY H. L. AMBLER, M.D., D.D.S., CLEVELAND, OHIO.

THE work of the philosopher studying the phenomena of nature, is accomplished either by the aid of observation or experiment. The highest delight of the true philosopher is in seeking out new facts, and the chief charm in electricity is in grasping the immeasurable phenomena which are presented to his senses, and arranging these facts until he finds that a few general laws govern all the diverse forms under which the protean agent manifests itself. The hope is held out that we may soon draw back a little farther the veil which hides one of the most fascinating mysteries of nature.

The tendency of modern science is to remove day by day the barrier between its different branches. The difficulties formerly met with from an unstable knowledge of electrical phenomena, are now replaced by more exact science. Sufficient information of many of the phases under which electricity is found in the organic, as well as in the inorganic kingdom is, now held, from which we may form the basis of a study of electrolysis and cataphoresis in its effects on living and diseased tissue.

A large amount of physical, laboratory, and clinical work has been submitted to a careful scrutiny. Fortunately clinical experience is so rich in the materials offered for our study, that there is a fruitful source for speculation as well as theory. Theory should be supported by the facts of experiment, if we wish theory

\* Read before the Northern Ohio Dental Society, June, 1897.

to be proved, and herein lies the difficulty ; for in chemical science we can prove a theory by physical analysis and synthesis ; in physiology we can bring to bear the observations of the minute animal structures, whether these are seen in healthy tissue or after it has been the subject of disease. Living tissues are certainly destroyed by electrolysis, but this effect cannot be definitely stated, because physiology has not yet laid down in what physical condition the life or death of a structure consists. It is not improbable that at some future day the life or death of a cell may be explained by the clearer interpretation of the natural forces. Many of the organic chemical changes in tissue may be inferred from the results of experiments upon organic chemical compounds, which may be carried on in the laboratory.

We have no right, of course, to assume that the same changes which are discovered from electrolysis of the chemical substances of dead tissue are the same as the electrolysis of living tissue. We may, however, assume that the truths of chemical science may be equally appropriate for chemical compounds which are contained in the structures of living tissues.

The manner of using electrolysis or cataphoresis can be better understood by a knowledge of its practical application, and we should become acquainted with the conditions under which electricity is recognized. According to Burgoin, the phenomena of electrolysis are as simple, primarily, with the organic as with the inorganic salts ; the metal or basic hydrogen will go over to the negative pole, and the acid portion of the organic salt will appear at the positive pole.

There is another action besides that of pure electrolysis, which has its effects upon tissue changes ; this is the physical effect of osmosis, or the cataphoric action of electricity. This peculiar property is the same for all fluid bodies, and consists of the power of actually transferring the particles of fluid towards the negative pole. There is sufficient evidence to show that the particular form of the tissues in the human body is so arranged, by means of porous mediums and the disposition of their contained water or saline solutions, to favor especially this cataphoric action of electricity. By means of this physical principle the tissues nearest the electrodes must be subjected to some action, which may assist or retard the functional activity of cell life ; hence if we apply a proper medicament to any portion of the

oral tissues, or to a carious tooth cavity, we may by electrolysis, cataphoresis, or perhaps a combination of both, retard the growth or destroy the micro-organisms ever present.

Miller says: "That even weak electric currents sometimes appear to have a slight retarding action upon the development of bacteria, and may be demonstrated, viz.: A tube of culture gelatine is richly infected with a bacterium which grows rapidly at room temperature, without liquefying the gelatine; it is then poured upon a glass plate in the usual manner. While the gelatine is still liquid, place upon the plate a strip, one end of which is composed of tin, the other of gold. On the border of the tin, a retardation of the development of the bacteria will be observed; the gelatine remains clear. In a few days the tin (electro-positive pole) will appear surrounded by a white zone; the reaction in this zone will be strongly acid. The retardation in the development is to be ascribed not to the electricity, but to the acid. On the border of the gold the reaction will be alkaline. The development of the bacteria is here also retarded, but much less than on the margin of the tin."

To demonstrate the action of cataphoresis, Mr. Edison made an experiment on a healthy young laborer, who dipped one hand in a solution of common salt, and the other in a 5 % solution of lithium chloride in water, for two hours daily for ten days. His urine, examined before the test, showed no more than mere traces of lithium. His urine, collected during that period, exhibited distinct presence of lithium; five milliamperes were used.

Another trial was upon an old man suffering from acute and chronic uric acid concretions. He was in an advanced stage of the ailment, and most of his joints were affected; the joints between the phalanges were almost obliterated. He immersed one hand in lithium chloride solution, the other in common salt solution, while a current from the 120 volt electric light circuit was employed, through resistance, to pass through his body. Measurements of the hand in the lithium chloride solution showed, after some 25 hours of application, a distinct reduction of bulk. There was also considerable relief from pain, and the general condition of the patient was ameliorated. The current strength in his case was 20 milliamperes (four times more than the previous healthy subject could stand with convenience). The earlier criticisms of medical men, that there was no such thing as anodal

diffusion of drugs, must, in the face of such evidence, be entirely silenced.

More than thirty years ago, Ficinus attributed dental caries to a putrefaction, produced by a minute infusorial animalcule, which lives in the mouth, and to which he gave the name of *Denticola*. These infusoria are found in great numbers in the mucus which covers the teeth, as well as carious teeth. They produce a putrefaction which first attacks the enamel cuticle, proceeds to consume the enamel and afterwards the dentine. He thinks that the fibres described by Buhlman, and which are no other than the filaments of the *Leptothrix buccalis*, derive their origin from the infusoria which he calls *Denticola*, and that the former are formed by contact with the latter. Soon after this Klencke said soft caries was due to the proliferation of a vegetable parasite called *protococcus dentalis*. At the present time we take it for granted that everyone believes that there are several kinds of microbes found in the mouth, and in carious teeth. Can we bring electricity to our aid in destroying them and curing the diseases they produce? The conditions brought to our notice in the mouth, are largely the products of germ action and tissue reaction. How electricity may be brought to bear as a curative agent, is best understood after studying its influences upon these two elements in the disease; the one germ action being the original and continuing cause; the other, resultant tissue changes—being the disease itself as an appreciable entity to the patient and dentist. The influence of the constant galvanic current on the vitality of microbes has been investigated by Schiel, Cohn, Mendelsohn, Apostoli, and Laguerriere. The latter observers made a thorough study of the subject during a series of 52 experiments on the microbes of anthrax, pus, and various non-pathogenic varieties, in which 149 guinea-pigs, 42 rabbits, and 2 dogs were killed. The apparatus found best adapted to the determination of the action of each pole upon cultures of various microbes in broth is illustrated in Fig. 1.

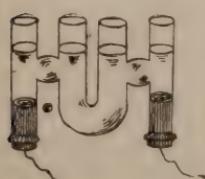


Fig. 1.

By the use of this apparatus it was possible not only to isolate the action of each pole in its tube, but also to test the inter-polar effect adjacent to each pole. As was to be expected, the passage of strong currents from the surface of small platinum spirals through the peptonized broth caused a decided rise of temperature,

particularly at the positive pole. In some of the experiments this thermal influence was eliminated by placing the apparatus on ice. In others the chemical liberated at each pole was eliminated, either by the use of an absorbent, as magnesium or lead at the positive pole, or by being covered with gelosine. The results showed a distinct attenuation or destruction of the microbes when currents of more than 50 milliamperes were used for five minutes. Beneath that dosage the action of the positive pole actually increased the virulence of the microbes, doubtless by reason of the addition of free oxygen to the media and a moderate increase of temperature. It was further proven that neither the negative pole nor the transmitted current through the interpolar region exerted any influence on the vigor of cultures, and that the action at the positive pole was entirely dependent on the heat and the nascent chemical products that were developed. These experiments may discourage the use of galvanic applications *per se*, in some cavities of the body, since current strengths sufficient to cure certain cases do not develop this quality. They prove, nevertheless, that where currents exceeding 100 or 150 milliamperes are called for in their curative capacity, we may also anticipate a direct microbicidal action accompanying them, if the electrode surface is small enough to intensify the action. In the extension of the current strength to the amperages used in cancer, for instance, 400 to 600 milliamperes, we also employ a most efficient and thorough antiseptic application. For antiseptic action in currents of 50 milliamperes and under, we must rely upon antiseptic cataphoresis, in which it is possible that minute currents may be made efficient by surrounding the active pole with cotton covering, holding such substances as a dilute solution of bichlorid of mercury, creosote, iodin, etc.

Dr. Herdman says: "Endometritis is an inflammatory condition due to the action of micro-organisms, and here the galvanic current may be made to play an important role in the treatment, for it is an antiseptic and germicidal application for a disease of ascertained microbic origin. Ringworm and the different varieties of tinea are produced by vegetable parasites, which make the skin, the hair roots, and other appendages their habitat. In the various forms of this disease the cataphoric action of electricity is made use of for the purpose of conveying medicaments, usually of a parasiticidal nature on the positive pole into the deep

layers of the skin. The strength of the current should be all that the patient is able to bear. A 1% solution of bichlorid of mercury has been used with good results. In these diseases the scope of electricity has been recognized and the field of its application enlarged, until to-day there can hardly be found a specialist on the skin, who has not a suitable electrical apparatus for treating the various cases in which this agent may be of benefit. Electricity tends not only to destroy the parasite, but at the same time improves the nutrition of the skin.

Carbuncle is without doubt, an infectious disease, caused by the presence of a bacterium. Galvanic electricity has been successfully used to abort and cure carbuncles, boils, and other suppurative diseases of the skin; to be of avail the disease must be taken at its incipiency.

Elephantiasis is a chronic hypertrophic disease of the skin and subcutaneous tissue, characterized by an increase in volume of the affected part, deformity of the veins, inflammation of the lymphatics, oedema, thickening and induration. The disease is unquestionably parasitic, and can often be successfully treated by electricity.

Erysipelas is an acute inflammation of the skin, caused by the invasion of a specific micro-organism, known as the streptococcus erysipelatus. This disease may be checked by the application of galvanic electricity.

In granular conjunctivitis, it is possible, by caustics and excision of the conjunctiva, to get rid of the bacteria, which are a part of the morbid condition, but with a platinum needle the supply vessel of the granulation can be followed back to its source of origin, and the base of supplies thus cut off, and it is possible to coagulate the entire contents of a small sac and thus render antiseptic the most likely lurking place of the micro-organism.

Acute gonorrhreal inflammation is due to the presence of a specific microbe, the gonococcus, and that therefore the curative action of any agent in this disease must depend upon its power to destroy this noxious agent. Careful experiments have been made in order to determine the destructive action of the galvanic current on this germ. Apostoli and Laguerriere demonstrated the following principles: The microbicidal action of the galvanic current is limited to the positive pole, and is probably due to the nascent oxygen which the electrolytic action of the current sets

free at this point. The current must have at least 50 milliamperes to produce any microbicidal action: its action at this point is feeble, and to be surely fatal the strength should be 200 to 300 milliamperes. If the current is less than 50 it does not destroy the microbes, but has a revivifying action upon them, owing to the presence of oxygen in very small quantities. The great difficulty is to find a method of applying a current strong enough to have germicidal action, without injuring the delicate lining membrane of the urethra, but the science of electricity is advancing with giant strides, and what is unknown to-day may be revealed to-morrow.

Some time ago Boccolari and Manzieri published their use of the anodal diffusion of drugs, in parasitic affections of hair roots.

An electricized body exerts a repelling force upon a body charged with a similar kind of electricity. In order to overcome the opposing energy an expenditure of a definite amount of force must be used, which will be greater according to the higher amount of electricity with which the opposing energy is brought in opposition. In bringing up this opposing force against the repelling force, a large amount of expenditure is required which is not appreciable, because it is neutralized by the energy which it opposes. When the body acts as a medium of conduction, the amount of electricity which flows into it from the point of origin, will, wherever it meets with resistance, be continuously subjected to an expenditure of force, which will be used up, or stored, as latent energy, and thus be deprived of its power of acting as an electro-chemical equivalent in destroying the organic compounds with which the electrode may be in contact. When the latent energy is free to act, it will perform work in some way or other upon living tissues whose composition forms a part of organic structures.

The references given to the use of electricity in different diseases caused by microbes, show that we have a weapon which we may use as a destroying agent, thus we should exercise caution to prevent injury. Experience and study will tell us when and how to use electricity as a curative agent, and will also show us how to use in a skillful manner an agent whose property is largely known as a destroying engine; we should seek to employ it as a mechanic uses steam, remembering that the very power

which it possesses makes it useful only when restrained and controlled by discretion.

Perhaps different kinds of microbes present different degrees of resistance to electricity or medicaments applied cataphorically.

In a tooth cavity we expect to apply more voltage to force the drug into the dentin so as to reach and destroy the bacteria, than when operating on the soft tissues.

If we put one per cent. solution bichlorid of mercury, or some other suitable disinfectant, into every cavity, after excavating, and before filling, then turn on the current for a few minutes, would this not be the most thorough way of disinfecting, and would we not find less discoloration under gold fillings, and would not caries occur less frequently around the fillings?

A 75 % aqueous solution of silver nitrate is a very active disinfectant when applied cataphorically. This fact has been demonstrated by the culture method, and specimens show to the naked eye that the nitrate penetrates the tubuli, and when examined microscopically not a doubt remains in the mind of the observer. The fact that it is a powerful disinfectant and does penetrate when used cataphorically, brings us to the point that we know, that if there are any bacteria in cavities, that we have destroyed them, and also disinfected a zone of dentin, surrounding the cavity or root canal, and left a compound which is insoluble in the ordinary oral fluids, if for any reason in the future they come in contact with them.

It is only suggested to put silver nitrate into cavities which are to be filled with amalgam, and where there is no objection to discoloration; in all other cavities, use a disinfectant which will not produce discoloration. It is also suggested that in the treatment of the soft tissues of the oral cavity, antiseptics and disinfectants may be advantageously used cataphorically.

## Principles of Force and Anchorage in the Movement of Teeth.\*

BY C. S. CASE, D.D.S., M.D., CHICAGO, ILL.

IF there is one thing more important than another in the science of regulating teeth, it is a mind that is well trained in the simple laws of physics, with the ability to practically apply these laws to the invention, construction and management of regulating appliances.

In the voluminous literature and teachings upon the subject of orthodontia and dentistry in general, there is little to be learned of these most important basic principles. In our endeavor to become a great profession and completely disassociate ourselves as professional men from the fearful calamity of being classed as tradesmen and mechanics, there has been an unfortunate tendency to underrate the value of certain branches of knowledge that lie at the very foundation of dentistry, and which should form the only true basis to scientific training for almost everything we undertake as dentists.

In contradistinction to the course commonly pursued by most teachers in the department of orthodontia, I occupy no time in lengthy histories of cases in practice because I believe it to be far more important to train the minds of students: First, in certain broad and general principles relative to artistic and harmonious relations that will apply to all cases. Second, in the scientific application of force for every variety of movement of a tooth in any position; which will equip him from a mechanical standpoint for the movement of teeth, and finally for the complete management of the most difficult cases of irregularity. Certainly, this is the only true and scientific foundation for that display of individual thought and ingenuity which almost every case commands. He is now, if ever, able to invent something that will be applicable to the particular case in hand and which may differ in certain particulars from anything that has ever been used or ever can be used again. Furthermore, if correct artistic, physiological and mechanical principles are employed for the regulation of teeth, results are quite as reliable as most things in exact sciences,

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and therefore teaching along this line does not necessarily require to be founded on the experiences of practice.

In my teaching I dwell at considerable length upon the laws which govern the activities of force and the mechanical advantages of different methods of applying it in the practical movement of teeth. I treat a regulating apparatus together with the teeth to which it is attached, as a machine. The best definition of a machine is that it is an instrument interposed between a moving power and a resistance or work, with the view of changing the direction of force or otherwise modifying it.

The important difference between an ordinary and a regulating machine is, with the former power and work are the only important factors. A manufacturer, or person engaged in the use of machinery, is interested as to how much wood or coal, through the medium of its product steam or electricity, will produce a certain result in the form of work; means for taking care of the force of reaction is amply provided for in the substructure or the inertia of the machine itself. Whereas with a dental regulating machine, power applied by the operation counts for naught, while the factor, reaction on fulerum and anchorage, referred to in Newton's Third Law of Force, is of the most vital importance. This law is: "To every action there is an equal and contrary reaction." And this equal and contrary force of reaction, which of necessity is sustained by other vital tissues, should be neutralized, either by reciprocatory action upon other irregular teeth that require movement in an opposite direction, or by so distributing this force through the medium of a static anchorage that it will do the least harm to teeth in proper position.

I said that I considered the teeth grasped by a regulating apparatus as a part of the machine itself—as levers, if you please, doing work principally upon the bony structure surrounding their roots.

The ordinary lever is a rigid bar or inflexible rod resting upon a fixed prop called the fulcrum and having power and weight disposed at some two other points. The different ways in which the three factors, power, weight and fulcrum, can be disposed, gives rise to three kinds of levers. (See Fig. 1.)

Here again, as with machines in general, physics in computing quantities deals only with power and weight or work, exemplified, in the one general law of levers, i. e. "Power and weight

are in the inverse ratios to their distance from the fulcrum." Nothing is said of the force of reaction or the force sustained at the fulcrum; whereas with a tooth considered as a lever the action at fulcrum, as will be shown, is quite as important to us as at the points known as power and weight; and, moreover, it is important to keep in mind approximately the relation which it bears to these factors.

While it is never possible or necessary to accurately calculate these quantities, still in order to arrive at the rough estimate

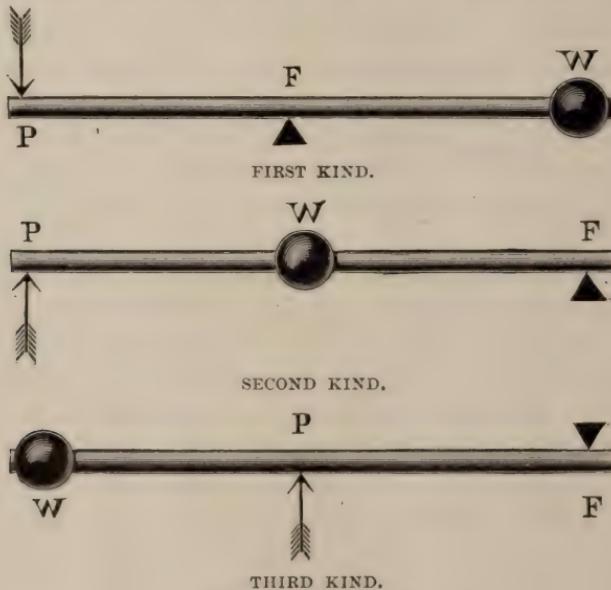


FIG. 1. LEVERS.

desirable, a clear conception of the mathematical methods employed under the laws of physics, especially those relating to levers, is very important. This can easily be approximated with levers when we remember that the force exerted or sustained by that factor situated between the other two—at equilibrium—is equal to the sum of the other two, be it power, weight, or fulcrum. That is why a lever of the second kind is always chosen where great force is required at the expense of motion. Again, in the typical lever the fulcrum is always considered a fixed point, but we are aware that there are a number of implements employed in mechanics that exert force according to the principles of levers, though in construction they differ in certain particulars from every

one of the three kinds. Common examples of this are all forms of the "pulley, the wheel and axle powers." There is, furthermore, a not uncommon kind of lever in which points of weight and fulcrum, in their activities upon each other, are more or less interchangeable—both acting as a fulcrum for the other, with varying stability and relative energy governed by the velocity of the moving power and the relative length of the power arm. An example of a lever of this kind is an oar of a row boat. In pro-

POST LEVER.

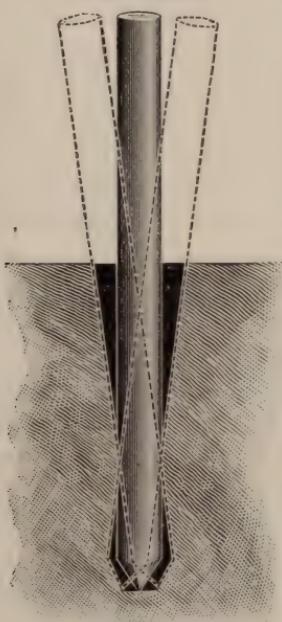


FIG. 2.

portion to the velocity of the moving power exerted by the rower, above the possibilities of the water to get out of the way of the blade, the oar becomes a lever of the second kind and the boat or work moves forward. But if the velocity of the moving power is not sufficient to overcome the inertia of the boat, the only work that the oar or lever can be said to accomplish is the movement of the yielding water in front of the blade, with fulcrum at the oar lock—or the action of a lever of the first kind.

If at any time you should drive a four foot post one-half its length into clayey soil of uniform quality, and then take hold of the top of the post and move it back and forth with a view of

pulling it out of the ground, you would be working a lever which combines the qualities of the first and second kinds, or one like the oar in which the so-called areas of power and weight act as fulcrums to the other. (See Fig. 2). After pulling the post out of the ground, if it were possible for you to make a transverse section of the soil for the purpose of examining the shape of the hole you had made, you would find the upper two-thirds a V-shaped opening tapered down to the diameter of the post; the lower third spreading out to an inverted V. As the post was forced in one direction the soil in front of it along the surface area would become impacted or thrust to one side, the whole acting as a lever of the second kind with fulcrum at the lower end. At some point along its length, however, it would cease to move in the direction of the applied power—the very resistance of the soil over the surface area of work, causing it in turn to act as a fulcrum and the whole as a lever of the first kind with work or movement at the lower end in the opposite direction.

The reason that the upper area of work is twice that of the lower may be found in an examination of laws which refer to the relation of the three factors of levers. Considered as a lever of the first kind, if the fulcrum or surface area of the ground is exactly in the center of the post, the force exerted upon it would be equal to the sum of power and weight, or twice as great as that exerted at the lower end or area of work. Again, when considered as a lever of the second kind—weight or work now being between and at an equal distance from power and fulcrum—it would be forced to receive a pressure equal to the sum of power and fulcrum or twice as great as that exerted at the lower end or fulcrum area.

I am in the habit of illustrating these important principles to my students by examples of some simple forms of levers of the first and second kinds. The beam of balance scales is a lever of the first kind. The support or central standard is the fulcrum, with points of power and weight at the end attachments for the pans. (See Fig. 3.) It can now be seen at once that when the beam or lever is at equilibrium the fulcrum sustains the sum of power and weight, and this would hold true of any lever of the first kind at whatever intermediate point between power and weight the fulcrum is placed. When the fulcrum is exactly in the middle of the lever, as with the example of the post lever, the

fulcrum receives twice as much force as is exerted at weight and consequently the post would move through the soil at the surface of the ground twice as far as at the lower end in the opposite direction.

An example of a lever of the second kind may be a rod or pole supporting a weight carried by two men. (See Fig. 4.) If the points at which the two men—whom we may call P. and W.—grasp the pole are four feet apart, and the weight is a pail of water weighing thirty pounds swung in the center of the pole,

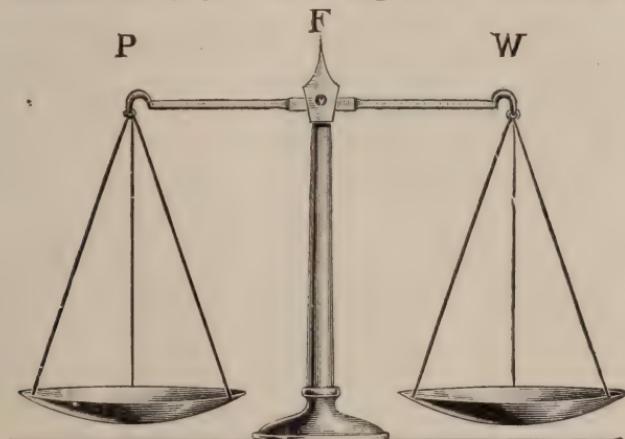


FIG. 3.

each man would exert a force equal to fifteen pounds. In other words, the force exerted at W. exactly in the middle of a lever at equilibrium would be twice that at the fulcrum. Here, again, we have the same result as that shown by the action of a lever of the first kind.

Now, if you please, note the change in the relative magnitude of force exerted at fulcrum and weight when the length of the power arm is shortened. (See Fig. 5). If P grasps the rod one foot from the pail, we have a three-foot lever with P exerting twice as much force as F, which may be proven by the rule of levers, *i. e.*, "power and weight are in the inverse ratios to their distance from fulcrum."

Power arm of the above lever—3 feet—is to W arm—2 feet as weight—30 pounds—is to P or 20 pounds, which leaves 10 pounds to be sustained by F. Therefore, the force exerted at weight in this lever is three times that at the fulcrum.

Again, if P grasps the rod six inches from the weight, he

exerts a force equal to four times that of F—determined by the same law. (See Fig. 6). Here the force exerted at weight is five times that at the fulcrum.

When we apply these rules to our post lever (which I have chosen to illustrate on a large scale, the action of the same character of force applied to a tooth), we can see that the inverted

LEVERS OF THE SECOND KIND.

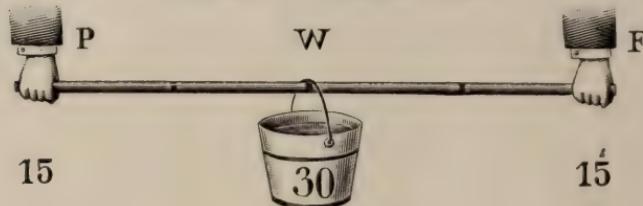


Fig. 4.

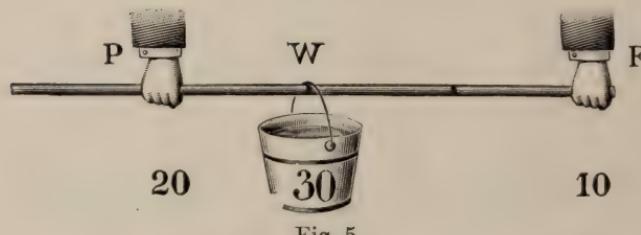


Fig. 5.

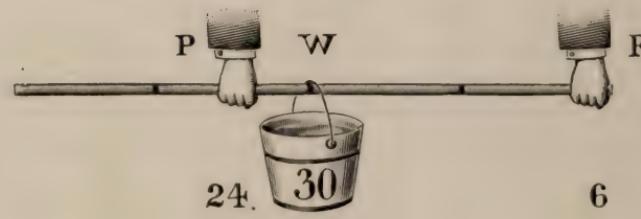


Fig. 6.

V-shaped opening caused by the lower end of the post moving in the opposite direction from the applied power may be changed quite decidedly in area by applying the power at different points along that portion of the post above the surface. For instance, when power is applied at the top of a four-foot post imbedded one-half its length in the ground, the movement at the lower end in the opposite direction will be one-half that at the surface of the ground in the direction of the power. When power is applied one foot from the ground, or at a point one-half the length of the exposed end, the movement at the lower end will be one-third

that at the surface, and when applied six inches from the ground (or as near to the alveolar margin of a tooth as the gum will permit) the movement at the lower end will be one-fifth that at the surface. While teeth differ in shape from each other and from the post lever I have described, and while their alveolar surroundings do not present a uniformity of resistance to their movement, and therefore while we cannot calculate force and motion, with



Fig. 7.

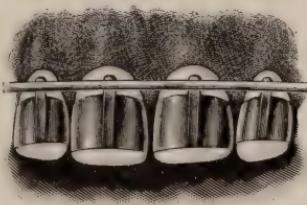


Fig. 8.

mathematical accuracy, still the fact that they are imbedded one-half their length in a yielding substance and subject to the frequent application of force for the correction of irregularities, the only way by which we can approach an exact science in the application of power for their movement is to consider them as



Fig. 9.

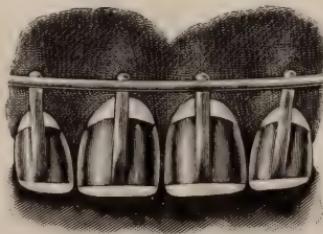


Fig. 10.

levers propelled by a machine doing work on the tissues in which they are imbedded.

When power is applied at one point to the crown of a tooth at right angles to its long axis, it becomes a lever with combined qualities of the first and second kinds. It is one more than the other in proportion to the relative difference in the resistance between cervical and apical portions. And while the relative proportion of movements at these points will be governed largely by the stability of their bony surroundings, it may be influenced

considerably—as with the post lever—by the position upon the crown at which power is applied. For instance, in the construction of an appliance for the retrusion or retraction of the incisors with a traction wire extending from molar anchorages, if we wish the least movement possible of the roots in the opposite direction, the wire should rest upon the incisors as near to the gingival margins as the gums will permit. I usually solder to the bands considerably—as with the post lever—by the position upon the upright bars which extend to the highest points of the exposed faces of the crown. Grooves or rests are cut at the upper ends of these for the wire, enabling it to span the interproximate gingivæ. (See Figs. 7-8). I frequently extend these bars above the gum margins, as shown in Figs. 9-10, in order to apply power that is equivalent to direct force upon the roots at points above the

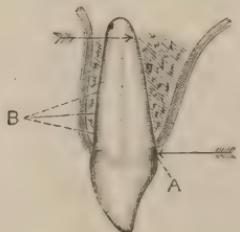


Fig. 11.

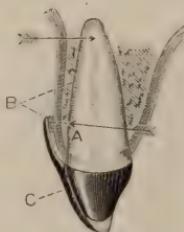


Fig. 12.

margins of the alveoli, and I find these procedures of the greatest importance in arriving at results for which they are designed.

It is not necessary for me at this time to multiply descriptions of methods relative to other teeth and conditions where this important principle may be employed, further than to say, that whenever it is desired to avoid producing an abnormal inclination of the crowns of teeth in the direction of the applied power, it is important and nearly always possible to take advantage of this or some other equally effective mechanical principle. On the other hand, whenever in the movement of a crown under the application of a single force it is desired to move the root in the opposite direction, the force should be applied as near as possible to the occluding border. This is especially applicable in those very common cases of protruded crowns of the superior incisors, with a retrusion of the roots; the teeth often assuming a decided labial inclination with the production of a depression along the superior portion of the upper lip.

A tooth becomes a lever of the third kind when the power is applied at or near the cervix with the establishment of a mechanical fulcrum near the occlusal portion of crown, forcing work or movement of the entire root in the direction of the applied power. (See Fig. 13). This is one of the most important and practical principles in dental and facial orthopedia and one, moreover, to which I am indebted for nearly everything I have accomplished in the development of æsthetic facial contours. Instances where this principle may be used to advantage are almost limitless, either in the form of two forces exerting a regulated power in opposite directions for the purpose of tipping the root in its socket, or as power restrained by an independent fulcrum with the view of moving the entire root in one direction.

In a paper presented at the Tri-State dental meeting at Detroit, in 1895, I gave the following explanation:

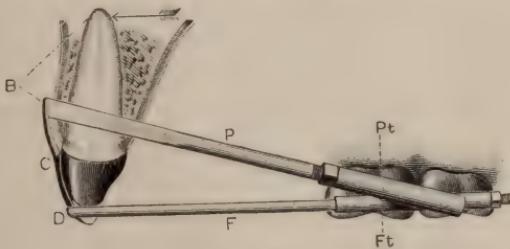


Fig. 13.

"The limited area upon which force can be applied to a tooth, compared to that portion covered by the gum and imbedded in a bony socket, has made it next to impossible with all ordinary methods, to move the apex of the root in the direction of the applied power; nor could this ever be accomplished with force exerted in the usual way at one point upon the crown, however near the margin of the gums it be applied, for the opposing margin of the alveolar socket must receive the magnitude of this direct force, and in proportion to its resistance it will become a fulcrum exerting a tendency to move the apex of the root in the opposite direction."

But if in the construction of the apparatus a static fulcrum is created independent of the alveolus, at a point near the occluding portion of the crown, while the power is applied at a point as far upon the root as the mechanical and other opportunities of the case will permit, the apparatus becomes a lever of the third

kind, the power being directed to a movement of the entire root in the direction of the applied force.

This proposition is made plain by reference to the diagrams. In Fig. 11 let A be a point upon a central incisor at which force is applied in the direction indicated by the arrow, then will the opposing wall B of the alveolar socket near its margin receive nearly all of the direct force; and in proportion to its resistance will there be a tendency to move the root in the opposite direction. This proposition will also hold good even if we apply the force at A, Fig. 12, or as far upon the root as may be permitted by attaching a rigid upright bar—C—to the anterior surface of the crown, the only difference being that we distribute the direct force over a greater area. But if, as in Fig. 13, we attach to the lower end of C a traction wire or bar F, and further enforce the mechanical principles of our machine by uniting its posterior attachment to the anchorage of the power bar P, we will have neutralized our anchorage force materially and created an independent static fulcrum at D. Our apparatus now will distribute its force over the entire root and give us complete direction and control of whatever power we put into it. The entire tooth can be carried forward bodily or either end can be made to move the more rapidly. The force thus directed to the ends of the roots will have an increased tendency to move the more or less yielding and cartilaginous bone in which they are imbedded.

An apparatus for moving the roots of the teeth in a posterior direction is constructed quite similarly—the direction of the two forces being reversed.

In that branch of my teaching entitled "Construction of Regulating Appliances and Their Management," I endeavor to arrange the work systematically according to the distinct mechanical principles involved in the scientific application of the required force. I divide the whole subject under this head into two general divisions entitled respectively, action and reaction. Under the head of "action," which pertains exclusively to the movement of malposed teeth by the direct action of force, I take up—First, the movement of crowns in every direction. Second, the movement of roots in every direction, with or without the movement of their crowns. Third, rotating or turning of teeth on their long axes. Fourth, intrusion and extrusion or the gradual forcing of teeth in or out of their sockets.

The second main division of the work entitled reaction, pertains to the management of the opposing force to action. This I divide into—First, reciprocating or movable anchorages, describing methods for utilizing the force of reaction in the movement of other malposed teeth; and, second, stationary or static anchorage appliances for those cases of irregularities when the force of reaction to the work of regulating must be sustained by tissues which surround teeth that we do not wish to move. These are usually the posterior teeth. To prevent these teeth from being tipped, or even lifted in their sockets, as might sometimes occur, the force must be evenly distributed over the entire anterior or posterior surfaces of the alveoli for all the roots.

If the appliance is loosely attached to the teeth, or permits the slightest hinge-movement there would be nothing to prevent this tipping tendency. When considerable force is required, two or three teeth should be included in the grasp of the anchorage appliance, using German silver or platinized gold bands, from six to ten thousandths of an inch in thickness (Nos. 33 to 30 B. & S. Gauge) and as wide as the teeth will permit. When soldered and properly contoured to perfectly fit the crowns, take a plaster impression of them in position, after which carefully remove the bands, place them in the impression and fill with Teague's or any good investing material. Flow solder between the bands uniting their proximal surfaces and fill the V-shaped spaces on either side. To more perfectly reinforce the appliance fit and solder to the lingual surface a flattened piece of No. 16 wire, after which attach the tubes for the power bars or traction wires, applying the power as near to the gingival margin as possible. Such an appliance will hold the teeth rigidly in its grasp in an upright position. When a single isolated molar must be used for an anchorage attachment the band should be wide and thick, fitted and cemented as carefully as a crown, and with rigid attachments for inflexible extensions; if a flexible traction wire is used to transfer the power no obstruction is offered to the tipping tendency of the molar. The same is true with an inflexible power rod if the band is thin, narrow and yielding, or in any way movable upon the tooth, or if the power tube is short and loosely fitted in the band. To further secure immobility of a single anchorage tooth, have the power tube sufficiently long to permit reinforcing at either end with solder to the full width of the

tooth and large enough to carry an inflexible power rod. When it is possible the power tube may rest above the gingival margin soldered to an extension plate that is fitted or swaged to the surface of the crown and so shaped as to freely clear the gum.

For regulating protrusion in children, with only the immature first molars for anchorage, the lingual supporting tubes should be sufficiently large to allow the ends of the wire that engage with the incisors to easily glide into them as the incisors are forced back with an encircling traction wire.

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### Phenomena of Cataphoresis.

BY WESTON A. PRICE, D.D.S., CLEVELAND, O.

(Continued from page 530.)

THIS brings us to a consideration of the last question, viz., What are the laws of electrolysis?

#### WHAT IS ELECTROLYSIS?

“It is the change that is effected by the passage of an electric current in so far as the electricity exhibits itself as such.” How is electricity conducted? As expressed by Nernst and translated by Palmer, “The conveyance of electricity in conducting substances may happen in two ways, viz., with or without the associated transportation of matter. The latter happens in the case of metallic conductors (first class); the former in electrolytic conductors (second class); hence these are called conductors of the (first) and (second) class respectively.” The nature of conduction in the first class (metallic) is unknown, but the nature of conduction in the second-class, namely, electrolysis, is quite perfectly understood. From the above author I quote that, “The process of the conduction of a current, as a result of electric forces, consists in the displacement of free ions. By free ions we mean those which are not united with each other to form electrically neutral molecules; the positive ions migrate in a direction from anode to cathode, the negative ions in the opposite direction.”

A solution conducts electricity better the more numerous the ions and the smaller the friction which they encounter in their migration. This conception may be applied unchanged to every

substance which conducts electrolytically—whether gaseous, liquid or solid ; whether simple or a mixture. In so much as it is impossible for a weighable quantity of a substance to consist solely of positive or negative ions—because this would signify the accumulation of such immense quantities of electricity that the substance would at once be dissipated in consequence of the repulsion; therefore, only *compound substances* (but no elements) have the property of electrolytic conductivity.

Moreover, the molecules of the conducting substances must be dissociated in order that there may be free ions present; and the free ions are divided into two classes which are sharply contrasted, accordingly as they are positively or negatively charged. The electrolytic charges of the ions are equally great and equivalent whether they occur in solution or in substances having a simple composition. This would be anticipated, because the fundamental laws of Faraday hold good both for water solution and also for fused salts. It is very remarkable that *we do not know of any electrolyte which, in the pure state and at ordinary temperatures, has the power of (electrolytic) conductivity to any marked extent.* Thus, neither liquid hydrochloric acid nor pure water can conduct electricity noticeably. But when they are mixed they become conductors. The reason for this certainly is not that the ions in the pure liquid experience too great a resistance to their movement, but rather that the liquid electrolytes in the pure state are dissociated only to the very slightest extent. In the passage of a current through any liquid except a metal, the current can pass only by dissociating some of the molecules, called the ionization of the medium, and these ions which are equal in quantity migrate in their respective directions. The measure of the ions traveling in either direction is the exact measure of the ions traveling in the other direction also the measure of the current flowing.

This is expressed by Nernst as follows—"When the galvanic current passes through conductors of the second class, viz., electrolytes, then, in addition to liberation of the heat, there occurs a transportation of matter (migrations of the ions); and also on the limiting surfaces between the conductors of the first and second classes there occur peculiar chemical processes. The latter consist primarily in the solution of the electrodes or in the separation of the ions from the electrolytes, but they are usually

complicated by secondary reactions between the electrolyte and the separated products."

The quantity of the ion separated in unit of time upon the electrode is proportional to the intensity (strength) of the current; and the same quantity of electricity will in the most various electrolytes electrolyse chemically equivalent quantities of ions. In those cases where the chemical value of the ions is capable of changing, of course the meaning of *chemical equivalence* changes; thus the same current which separates 200 grams of mercury from a solution of  $HgNO_3$  will separate 100 grams from a solution of  $HgCl_2$ . The above author says, "It is only in the rarest cases that the ions themselves are formed as the products of electrolysis, i. e., products which have the same composition as the ions as they are primarily separated, which differ from the ions only by having given up their electric charges. Thus the hydrogen ions appear in the form of  $H_2$ ; the ions of certain metals in the form of metals; and under suitable conditions the ions of the haloids (acidiferous elements) in the form of metaloids. But much more frequently the ions either act upon each other on being separated, as in the decomposition of the acetic acid ion according to the equation,  $2CH_3COO = C_2H_6 + 2CO_2$ , producing ethene and carbon dioxid; or the ions may react upon the water, as when separated sodium gives off secondary hydrogen; or finally the ions may react *upon the metal of the electrode*, as when separated chlorin forms the respective chlorid."

The (freshly separated) ions, which have been deprived of their charges by aid of the passage of powerful electric energy, are illustrations of substances containing a large quantity of free energy, that is, illustrations of great affinity. The (freshly separated) ions are able to perform reactions of which they are quite incapable in the ordinary state; thus freshly separated hydrogen, unlike ordinary hydrogen, can reduce nitric acid to the so-called "nascent state." It is especially worthy of our notice here that electrolytic dissociation, as compared with ordinary dissociation, is influenced but slightly by temperature. In fact it sometimes happens that with rising temperature it diminishes, or it may slightly increase, which is in strong contrast with ordinary dissociation, which always rapidly increases with rise of temperature.

Let us now apply some of these laws of electrolysis to the particular process in which we are interested. Suppose the posi-

tive pole to be applied to the dentin of a tooth and the negative to the cheek. An interposing layer of medicament, say cocaine in water solution, is between the metallic positive electrode and the dentin. Now the only way electricity can get from the metallic positive electrode to the metallic negative electrode is by the dissociation of some of the molecules in every substance through which it passes. In every part of the course through the cocaine solution, the dentin, the pulp, the connective tissue, the blood vessels, the muscle tissue, and sponge on the negative electrode, there will be a cleavage of some of the molecules of the various chemical compositions into a positive and a negative ion. These ions, with equal force and chemical equivalence, start on their respective journeys toward their opposite poles. They meet with friction, which varies for different ions, and since they have the same forces behind pushing them, their velocities will vary with their resistance. If in their course they meet a new ion or an element or a compound for which they have a greater affinity than the force which separated them, they will unite with it until they are again called into service. Unless an ion found such an affinity it would keep on going until it got to the metal plate of negative electrode, and if it could unite with it would do so. If not, would be deposited upon it or be liberated in the form of gas.

Now the question we have heard raised so often.

“IS THE CURRENT WE USE STRONG ENOUGH TO PRODUCE ANY  
ELECTROLYSIS?”

must be settled, for if we have no electrolysis we cannot have any current flowing, and the measure of the current is the measure of the electrolysis, and vice versa. In the case above the hydrochlorate of cocaine would be broken up, as follows: The acid radical will be negatively charged and will go to the positive pole and the alkaloid will be positively charged, and will go to the negative pole. As it passes into the tissue it will doubtless meet ions coming toward the positive pole and at once there will be formed new products, compounds of cocaine, in the tissue. Now it is a fact that only a small per cent of the molecules will ionize or dissociate, hence we see why there has been practically no difference in the effect we observed from using a saturated solution of cocaine or a one per cent solution.

I have observed the following results by applying the cocaine solution as stated above: *First.* In nearly 1,500 cases, of which I have kept a record, and in many a complete record of the amperage, the voltage and the resistance at both the beginning and the ending of the operation; also the time, size of cavity and medicine used, the per cent. of perfectly successful operations has been between 95 and 100, and of late, with the increase of experience, all cases have been successful on the second application, if not on the first. Of these fully 100 were cases in which the pulp was entirely removed at the time, and in about 200 more the pulp was drilled into and partly removed and a devitalizing agent used to complete the destruction. *Second.* In almost all cases of single-rooted teeth the nerve was entirely removed at the time. *Third.* No sensation of pain was felt from the devitalizing agent applied after using cataphoresis. *Fourth.* Not a single case as yet of a dead pulp from the use of cataphoresis. *Fifth.* No difference has been noted in the time required for varying concentrations of cocaine or any other agent. *Sixth.* The average time required for all cases was about thirteen minutes. *Seventh.* The amount of current tolerable is determined by the effect of the current on the pulp tissue, and not in the dentin, in a case of unexposed healthy pulp. *Eighth.* The resistance through the wet dentin varies all the way from a few thousand to five hundred thousand ohms. *Ninth.* The amount of current tolerable has been found to vary from one two-hundred-thousandth to two thousandths of an ampere, the average being less than two ten-thousandths at the beginning of the operation and four ten-thousandths at the finish. Of course, where pulps were devitalized a very much stronger current was used for the finish, though seldom more than that amount was used where the continued life of a pulp was expected. *Tenth.* There are no constant symptoms that will give any indication of the amount of current flowing. Each case has a different pain limit. Hence the absolute necessity of using a milliamperemeter. *Eleventh.* No effect has ever been noted in the tissues beyond the tooth, except where a very strong current was used, then slight periostitis.

#### WHAT DEDUCTIONS CAN WE MAKE FROM THESE RESULTS?

We know that when a solution of cocaine is applied to the dentin of a tooth, under the positive pole, with a negative else-

where, we do get anesthesia, not only of the dentin, but of the pulp tissue, if applied long enough. Will the constant current alone produce this condition? No. Then it is not the current that does the work. Will the medicine alone produce this condition? No. Then it is not a simple osmosis. Does the current so applied produce any change in the cocaine solution? Yes, it cannot pass through it except by changing it.

Is there a transmission of matter in this solution under these conditions by simple osmosis? Probably very slight. Is there a considerable transmission of matter at all? Yes, by the migration of the ions. Do these ions produce currents which carry the unchanged medicine with them? Theoretically yes, but practically very slight. Are these currents produced in both directions? Yes. Can an osmosis be produced from a negative to a positive pole? Yes, in some solutions.

According to the older theories there was supposed to be a physical force exerted in some manner by the electric current applied in this manner, and this idea has its advocates yet. There is a newer theory, however, which is made to explain all the phenomena. Its advocates maintain that there is no transmission of matter except the ions themselves. Now to follow this argument in this connection, if it is the force of osmosis on which we are dependent, what will be the effect of new molecules of hydrochlorate of cocaine being formed in the pulp tissue by electrolysis if any are formed on the osmosis from without? Of course, if such be formed, it would diminish the difference of concentration within and without the pulp chamber, and by doing so would lessen the force of osmotic pressure, which is in direct proportion to the difference of concentration at various points. In this case it would not seem that the current was helping the process. It is certain that we are not dependent on a difference of concentration for the development of the force that carries the cocaine through the tissue.

DO WE KNOW THAT A MEDICAMENT CAN ACTUALLY BE FORCED  
INTO THE PULP AT ALL?

Yes, in many ways. I have put sulphate of morphin with the cocaine, and after extracting the pulp on a broach been able to detect the morphin by the nitric acid test under the microscope. I have killed a frog in twenty minutes with sulphate of strychn-

nin with the current, when neither the current alone nor the medicine alone, left for a considerable time, produced any noticeable effect. I do not believe the medicine was in any case carried in as the original chemical species, but was changed by electrolysis. And further, with the conditions under which we use cataphoresis, I believe the forces upon which we are dependent are the dissociation of the molecules and the increased energy of these dissociated products. These ions by their migration and by the new chemical species they form are capable of producing the same phenomena when studied outside the mouth under similar conditions. I have here three test-tubes; in the first, sodium sulfate, in the second sulfuric acid, one per cent, and in the third, water. We will apply the positive pole of this current to the first, and the negative to the third. Now these tubes are connected over the tops with strips of asbestos. If the electric current exerts a physical force on these solutions we should expect to see the sulfuric acid forced over into the neutral water solution and an acid condition produced. On the other hand, according to the laws of electrolysis, we should expect the acid ions to go the other direction and the sodium of the sulfate solutions to come over through the sulfuric solution and produce an alkaline condition about the negative pole. In a very few minutes with the 110 v. current we do get the alkaline condition at the negative pole.

The final goal is of course

#### TO DIMINISH THE TIME.

I do not believe this will be done by seeking directly for a substance that has a high osmotic pressure, but rather in seeking for a reaction that will produce the most active ion. It is true, however, that substances which have a high osmotic pressure have good conductivity. Since the amount of current we can use is limited by the pain limit of the tissue, and the amount of electrolysis is a constant expression of the strength of current, of course the amount of chemical energy we can liberate is fixed, and we cannot hope to change this unless we can change some of the laws of either *physiology, electrolysis or chemistry*. We have left these unfixed conditions to modify, viz., to select the ions with greatest migration velocity and which themselves or the compounds they will form will produce greater physiological effect.

upon the tissue for the same unit of concentration in the tissue. There is no reason why great advancement should not be expected in this direction, and it is my opinion that when it does come, it must come along this line.

I am indebted for valuable reference books to Prof. Morley, of the Western Reserve University; Prof. Miller, of Case School of Applied Science, and Prof. Herdman, of the University of Michigan.

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## ALL SORTS.

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### Gold Plating Solution.

I had a bottle, about half an ounce of gold-plating fluid given me, and was told to try it. It proved very satisfactory, especially in plating wire appliances that I use for regulating teeth after the Jackson method, or plating instruments that may suggest themselves to any of you. You can plate your syringe tip, or your mirrors, or your pliers, or anything you like, with gold. It stands perfectly well, and you can place as much or as little on the surface of the metal as you like, and I see no difference in its taking effect, either on piano-wire, or brass, or German silver. The instruments come with the material. It is furnished and prepared by a man named William J. Pohlman, Woodbrook Post-office, Maryland. The expense of a two-ounce vial is two dollars and a half. Just about how much that would plate I cannot state. I plated nearly everything I had in the office that I could plate, and I still have a great deal left. If you have a regulating appliance, for instance, it can be plated with perfect ease inside of five minutes, provided the surface is polished, of course. The solution is in a concentrated form. You dilute with water, warm it, place in a porcelain or glass vessel and place your article in the fluid, and then hold a small piece of zinc, which comes with the package, in contact with the thing to be plated. Instantly you have a coating of gold on whatever you wish to plate. It also deposits the same amount of metal on the zinc, and, that, of course, is lost, as each time you need to clean the zinc thoroughly. It is all done in a moment almost. I have procured some of the silver plating also, but as yet have not used it. It stands perfectly well in the mouth. You can solder gold on steel wire perfectly well, and it seems to be very nice. By giving piano-wire in the mouth a gold finish in this manner, the patient appreciates it and it is very useful.—DR. GAYLORD, *Cosmos*.

### Antiseptic Treatment for Putrid Root Canals.

M. de Marion's antiseptic treatment of putrid root-canals is as follows: He opens the pulp chamber as usual and cleans that as well as the canals of all putrid matter. Formaldehyd is then introduced on threads of cotton and evaporated with a heated silver wire. This treatment is repeated two or three times at same sitting. A temporary dressing is now made of cotton shreds saturated with formaldehyd and geranium and the cavity is closed airtight, with wax or gutta-percha. Two or three days afterwards the same treatment is repeated. The essence of geranium serves to find out any putrid matter; left in contact with the same, it changes its mild and agreeable smell, and only when the latter is pure a permanent filling can be inserted.—F. A. B., in *Dental Weekly*.

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### To Overcome Some Faults in Bridge-work.

First, where the piers are not parallel, *all bridges are ill-fitting in proportion as the piers diverge from the parallel*; second, *the dummies cover too much tissue*, in time causing irritation. These evils can and should be corrected.

In regard to the first, how shall we parallel the piers? There is probably not an operator present who would attempt to fill an approximal cavity without first securing space to properly restore the original contour. The same conditions exist here, only in a more exaggerated form, and the same principles should therefore apply. Call orthodontia to your aid, correct the position of these malposed teeth. Straighten them up until the piers are parallel, thus eliminating the V-shaped space, securing better occlusion, and placing the abutments in position to receive the finished bridge without injury either to teeth or bands. The bridge then fits as was intended. The piers being parallel, there is no excuse for a misfitting case. Furthermore, the bridge acts as a permanent retaining appliance, holding the former malposed teeth in their proper positions. Do not attempt to parallel the piers by grinding. It is a very deceptive practice, and in nearly all cases the band leaves the tooth on the mesioproximal surface in proportion to the distance it is forced down. Regulate the teeth, and the construction of a neat-fitting bridge is made easy.

We will next take up the second criticism, that the dummies cover too much tissue and cause irritation. This defect is more easily overcome. The saddle should be made as narrow as possible. For, arguing from cause to effect, we find in this connection irritation and inflammation to be the result of uncleanness caused by lodgment and decompo-

sition of particles of food held against the tissues by the saddle. Therefore, as the most approved methods direct us to rest the saddle firmly on the ridge, we should so construct it as to cover the minimum amount of tissue. Make the case entirely of metal, making dummies with full-size grinding surface and the narrowest possible saddle, resting squarely on the top of ridge. The dummy slopes gracefully from the grinding surface to point of contact with ridge, but buccally and lingually; its construction is simple. With pin vise and wire secure shape and size you wish to make the saddle. Cut and straighten wires and you have length of band at both grinding-surface and ridge. Cut band by the measurements and it presents this form. Solder bands and flatten cervical end till shape of saddle is secured. File to fit ridge perfectly. Then burnish pure gold or platinum, thirty-two gauge, to ridge and solder to band. Construct cusps and secure articulation in the usual manner. Solder, and the dummy is complete. Carve model just enough to secure snug adaptation to ridge. Wax in place, invest and solder.

You have now constructed a bridge with parallel piers and a narrow saddle. This seems to be an ideal bridge, containing the combined good properties of strength, beauty, perfect occlusion, cleanliness, and it fits everywhere as was intended, eliminating the objectionable features of malposed teeth, V-shaped space, porcelain or combination of gold and porcelain, angles, pockets, wide saddle and ruined bands. This bridge will keep as clean as the adjoining natural teeth, which is the best you can do in any mouth, and will cause no irritation around piers, because they stand parallel, and there is no excuse for crowns not fitting. But little tissue is covered by the saddle, which is practically self-cleansing and causes no irritation.—F. F. FLETCHER, in *Dental Digest*.

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### Immediate Investing Material.

A nice and convenient way to make an investment for soldering, is to take a small quantity of asbestos fiber, place it in a dry rubber bowl and incorporate with the fingers as much of Teague's impression material as the asbestos will take up. Moisten the compound as you use it, and shape the investment with the fingers as desired, around the piece to be soldered. The investment becomes hard immediately on being heated, and does not change its shape at all. Plaster will not do as a substitute for Teague's material, as it will change its shape on being heated, even when mixed with asbestos.

In using the above to invest pieces of work held together by wax, the wax should always be removed by warming the investment and pick

ing it out with the point of a suitable instrument. Hot water poured upon the investment softens it on account of the asbestos fiber absorbing the water. Porcelain faces can be invested with this mixture and dried out immediately with the flame of a blowpipe without the least danger of cracking them.—H. R. J., in *Amer. Dental Weekly*.

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### The Use of Tempered Air and Chloroform for Hypersensitive Cavities.

All treatment must have for its object, exclusion of acids and other agencies of irritation found in the mouth.

The destruction of bacteria and the neutralization of their acid eliminations.

The employment of that which will retard or entirely stop the atomic movement of the protoplasm, yet not entirely destroy it.

This can be accomplished with dry air, at a temperature of 90° or 98°, after bathing with chloroform, applying it after the tooth has been isolated with the rubber dam, before any cutting is done within the cavity of decay. The air is applied continuously, until absolute dryness of the dentin is accomplished.

This done thoroughly (and at times it is difficult) there is little suffering on the part of the patient, from sensitive dentin, and the operator has the satisfaction of feeling that he has not deprived the tooth of any of its already low vitality, he has not subjected the pulp to any undue excitement, but has left the odontoblasts in a condition to resume their functions of depositing salts in the dentinal matrix.

All this has been accomplished by simply depriving the protoplasm of water, the main factor of molecular motion.—H. C. THOMPSON, in *Dental News*.

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### Silk Ligatures for Retaining Implanted Teeth.

I have studied and experimented with splints, plates, pins, anchorages and the various other devices employed for retaining the tooth in position before attachment of the tissues is accomplished. These are all subject to the objections that they are uncleanly, cumbersome, uncomfortable to the patient, and that they interfere with articulation and mastication. Such devices are prolific sources of the failure of operations. For the foregoing reasons I have adopted the use of silk ligatures, employing Corticelli or Carlton & Currier silk threads Nos. 000, 00, 0, and A. By the correct use of such thread the tooth may be so ligated as to be

held absolutely firm in its place, while the ligatures occupy so small a space that they will not act as irritants. Properly applied these ligatures will last from one to eight weeks.—DR. R. H. COOL in *Stomatological Gazette*.

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### Plaster Bowls, and Cleaning Same.

The best bowls we have found for mixing plaster are manufactured in Japan. They are procured at nearly all stores which deal in Japanese goods. The reason we have found them better than other bowls is because they are absolutely hemispherical, and they are covered with a peculiar enamel to which the plaster will not adhere. They are about four inches in diameter by about two inches high, and are perfectly plain, with no figuring either in the inside or out of the bowl. To clean these bowls we have found it best to let the remains of the plaster harden in them after use, when, if very hot water be poured into the bowl, the plaster peels off and leaves the bowl absolutely clean.

We are indebted to one of our exchanges for the suggestion of using hot water to cleanse the bowls, and having tried it have found it "A No. 1."—*Office and Laboratory*.

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### B R I E F S.

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**Never use Pink Rubber** where it will show if it is possible to fill the bill with gum teeth.—*Western Dental Journal*.

**To Make Sticky Wax.**—To make sticky wax for holding clasps in place, use resin two parts, beeswax one.—*Dom. Journal*.

**Use Rubber Dam when Swedging.**—When swedging use the dam between the plate and counter.—*J. G. Harper, in Digest*.

**Parr's Flux and Fluxed Wax** may be used in place of borax, and leaves no scales on the gold, and does not discolor.—*Dental Weekly*.

**To Strengthen Facings**, burnish the backing to an absolute fit, and let the backing extend to the extreme occlusal point.—*Western Dental Journal*.

**To Relieve Pain.**—An exchange says that hypodermic injections of the fluid extract of gelsemium will often relieve pain and spasms where morphin fails.

**Vulcanizer Packing.**—Heavy pasteboard makes a capital vulcanizer packing, and where vulcanizers leak, dusting on corn starch will stop it.—*Dom. Journal.*

**Formaldehyde as a Deodorizer.**—Ammonia and its compounds being often products of decomposition, formaldehyde becomes a very valuable agent as a deodorizer.

**Add Gum Arabic to Solder Flux.**—To keep your solder in place, add a little gum arabic to your flux, and rub with the borax and water on the slate.—*Dom. Journal.*

**To Deodorize Disagreeable Odors.**—To deodorize any disagreeable odors in the operating room, burn oil of cassia on a wisp of cotton over the alcohol lamp.—*Dental Weekly.*

**Method of Root-Filling.**—Dr. Delos Palmer uses a broach-shaped wire, electrically heated, for driving balsam del deserto into every portion of the root-canal and thoroughly filling it.

**Add Silica to Gold when Melting it.**—If you add two per cent. of silica to gold plate to be melted, you can accomplish it over the flame of a common candle.—*Dom. Journal.*

**A Hint about Cleaning Corundum Wheels.**—When you use alcohol to cut or sharpen a corundum wheel do not attempt to use the wheel until it is absolutely dry.—*Dom. Journal.*

**The Ideal Bridge** will contain a narrow saddle, which is hygienically correct, and parallel piers, as the only form permitting of perfect adaptation and occlusion.—*F. F. Fletcher, in Digest.*

**Add Cassia Oil.**—If a drop of oil of cassia is added to every ounce of Listerine, Pasteurine borolyptol or euthymol, it makes all of them more valuable as mouth washes.—*Dental Review.*

**Bevel the Edge of your Crowns or Bands** when fitted about the root, and if the fit is perfect, you will not have the objectionable irritation or recession of the gum.—*Western Dental Journal.*

**Make it Perfect.**—The dentist must not be satisfied with, "Oh, it will do," but must keep in mind that, especially in dental practice, what is worth doing at all is *worth doing well.*—*Western Dental Journal.*

**Two Points to be Guarded Against** are: first, in root-filling, not to let the fluid pass through, as it will inflame the periosteum; second, to protect the nearly exposed pulp in large cavities.—*S. T. Kirk, Amer. Dental Weekly.*

**Gold-Shell Crown.**—I would not discard the gold-shell crown for molars and bicuspids, as there is no other kind of crown which is so easily made, and, all things considered, gives such satisfaction.—*W. H. Bailey, Dental Weekly.*

**To Retard or Hasten the Setting of Cement.**—Pulverized borax, the least sprinkling, will retard the settling of oxyphosphate, and a part of a drop of hydrochloric acid, will yield the opposite effect.—*Dental News.*

**Splitting Ribbon Saws.**—The thin ribbon saws, so useful at the operating chair, are frequently too wide. They can be easily split in two with plate shears, and be made to serve their purpose much better.—*Amer. Dental Weekly.*

**To Temper Instruments.**—Carbolic acid solution is said to be splendid for tempering instruments. M. Leyat brings the steel to a red heat and dips it in the solution. It makes the steel harder and more elastic.—*F. E. B., Dental Weekly.*

**Continued Disinfection.**—As for the care of cases of hare-lip, cleft-palate, or other operations upon tissues adjacent to the oral cavity, constant and continued disinfection is of course an obvious necessity.—*G. V. I. Brown, in Dental Weekly.*

**You Should Use Electricity.**—Few dental offices are considered complete now, if the motor power is not electricity. Your laboratory lathe, dental engine, fan, etc., can all be worked by this subtle power at a small expense, and a saving of labor.—*Dental News.*

**Sandpaper your Joints.**—If you remove gum blocks from the flask, and rub the joints very lightly over fine sandpaper before replacing them, they can be packed much cleaner. Where there is any vestige of wax there will be unclean joints.—*Dom. Journal.*

**Tube Teeth Prevent Clicking of Dentures.**—The clicking complained of in continuous gum and vulcanite dentures does not occur in dentures fitted with tube teeth, the feeling of which to the tongue is the most natural attainable by artificial means.—*Ash's Quarterly.*

**Blowpipe for Waxing Cases.**—A convenient and efficient blowpipe for waxing cases is made by using the nozzle of a chip blower and the mouthpiece of a tobacco pipe, connecting the two with a piece of rubber tubing ten inches long.—*J. A. Robinson, in Dental Weekly.*

**Operations Should be Short.**—Long, severe operations should not be undertaken on patients while attending school, as the mental work

takes up so much of the vital force to supply its needs that there is little or nothing for the physical system to appropriate.—*Amer. Dental Weekly.*

**Pulp-Capping Material.**—Iodoform powder made in paste with creosote, and flowed gently over the exposure, protected by cement applied over it in the same manner, comes as near perfection as a pulp-capping as anything in my experience or observation.—*D. D. Atkinson, Dental Weekly.*

**To Obviate Taking More than One Impression of the Mouth,** use the die to make an impression in compound and in the impression pour the metal; this die will do for the first swedging and you can use the die made in the plaster impression for the final swedge.—*J. G. Harper, Digest.*

**How to Preserve Gutta-Percha.**—Gutta-percha remains almost entirely unchanged if it is covered with water, especially sea-water, or if it is protected from the action of light. The readiness with which it suffers change in the air or under the action of light-rays materially limits its employment.

**The Old Pivot Tooth.**—In cases of emergency, or for economical reasons, the old style pivot tooth can be quickly placed in position and made reasonably secure, by using cement in the crown and root, observing the precaution to keep the wood perfectly dry in order to insure union with the cement.—*Dental Weekly.*

**Negative Electrode for Bleaching.**—So far we have all been bleaching “with the cart before the horse.” We have made use of the positive electrode in the tooth. Experiment has demonstrated that the negative electrode should be substituted. This is in accord with the law of electrical osmosis.—*F. W. Low, Cosmos.*

**Cement and Porcelain Dust.**—Dr. Dunn, Sr., of Florence, Italy, incorporates a small amount of porcelain dust (prepared by pounding old porcelain teeth fine) with cement. The mixture makes a very dense filling, with a hard flint-like surface, and is especially useful on masticating surfaces.—*Amer. Dental Weekly.*

**Preservation of Creosote.**—It is reported (*Pharm. Post*) that beechwood creosote is best preserved by exposing it, in glass-stoppered bottles, to direct sunlight. Kept in such a manner, it loses any color it may have had, and becomes perfectly colorless, and the reddish coloration it is liable to is, by this simple means, entirely avoided.

**Acetylene Gas Explosive.**—Acetylene gas *per se*, when under a pressure of something less than two atmospheres, is violently explosive;

whereas at a pressure of less than one and a-half atmospheres it appears to be reasonably free from liability to explosion, provided it is not admixed with oxygen or atmospheric air.—*Amer. Druggist.*

**Dental Wax.**—Take of French chalk, 14 parts; gum kauri, 8 parts; and stearine, 4 parts. Melt the stearine on a water bath, then add the finely powdered gum kauri in small quantities. When dissolved, sift in slowly the French chalk, and stir constantly till cold. The composition can be colored with carmine if desired.—*Dental Review.*

**Crowns With and Without Bands.**—For incisors and cuspids with pulp canals greatly enlarged by decay, it is necessary to use a band around the root; but in a large majority of incisors and cuspids to be crowned, the all-porcelain crown like the Logan, without band, makes the strongest and most natural crown.—*W. H. Bailey, Dental Weekly.*

**Sunlight as a Disinfectant.**—The effect of sunlight upon the cholera vibro and other bacilli varies according to the amount of air present. Thus sunlight is a destructive agent to micro-organisms when air is freely present. When air is excluded, the growth of the organisms is stimulated by the heat, but their virulence is not increased.—*Dr. Westbrook.*

**Resisting Properties of Gutta-Percha.**—Gutta-percha resists the influence of most solvents. Concentrated solutions of alkalies, salt solutions, and dilute acids, even hydroflouric acid, have no effect; absolute alcohol will dissolve by boiling only a portion of those resinous bodies with their content of oxygen,—about fifteen or twenty per cent.—*International.*

**To Prevent Loosening of Artificial Teeth.**—When making plates where the teeth are scattered we often find one or more porcelain teeth quite loose, owing to the contraction of the vulcanite. To prevent this, bend the pinheads from each other, forming a wedge. To prevent pinheads showing through finished plate, bend them down toward face of model.—*Dental News.*

**To Prevent Weeping Gum.**—Before mounting a crown on a root or abutment, or filling a labial cavity where a clamp or the dam cannot well be applied, a wisp of cotton on a broach, dipped in trichlor-acetic acid and passed gently under the gum margin, will prevent the weeping of the gum, thus keeping root and cavity dry. It is also a splendid styptic.—*Dental Weekly.*

**A Small Point.**—In capping small exposures, or when putting cement into an excessively sensitive cavity, use a stiff paste of white oxid of zinc and oil of cloves next the pulp or dentin. Make into a

little ball, and carry to the cavity with a bit of spunk in the pliers, the spunk coming away almost clean, or at most with only a little oil upon it.—*J. H. Hughes, Dental Review.*

**Use Alcohol as a Menstruum for Disinfectants.**—Dip an instrument in alcohol, and it will be instantly moistened all over; dip an instrument in water, and if it be at all greasy the water will not touch it. That is why, for general use in dental practice, alcohol is a safer solvent for disinfectants such as bichlorid of mercury, permanganate of potash, etc., than water is.—*Amer. Dental Weekly.*

**Production of Cocain in Peru.**—There are ten cocaine factories in Peru—five in Huanuco, one in the Monzon district, one in the Puzuzo district, two in Lima, and one in Callao. Of late the production of this valuable alkaloid is said to have decreased. This decrease is accounted for by the fact that its extraction is cheaper abroad, as is proved by the increase of the exports of coca leaves.—*Amer. Druggist.*

**How to Use Carborundum Wheels.**—In using carborundum wheels, they should be run at as high a speed as possible. This will, to a great extent, prevent the rapid wearing away of any soft places which there may be in them and thus tend to keep them true in use. Although great care is taken in the manufacture of the wheels, they cannot yet be produced of equal hardness throughout.—*Ash's Quarterly.*

**Anæsin a Local Anesthetic.**—Vamossy, *Centralblatt fur Chirurgie*, describes anæsin as a watery solution of acetonic acid trichloride, or acetone chloroform. He has found that a one-per-cent. solution has the anesthetic power of a two- or two-and-a-half per-cent solution of cocaine, that it is sterile, that it does not spoil on standing, that it does not irritate the part to which it is applied, and that it is not poisonous.

**Copal-Ether Varnish.**—Copal-ether is one of the best varnishes for cavities I have used. When a lining of gutta-percha is desired for the cervical margin, under a cement filling, the varnish enables you to place the gutta-percha firmly and accurately. I use it pretty generally under all fillings. It dries quickly and seems to be impervious to the fluids of the mouth.—*E. P. Beadles, in Amer. Dental Weekly.*

**To Drive Plate into Small Depressions in Die,** between the teeth for instance, lay a bar of lead on the plate and drive to place with hammer. This metal will not make a sharp enough die for a plate when cast in a modelling compound, as the large amount of metal softens the impression, but for small dies it cools quickly and gives a sharp die, therefore cast in a plaster of Paris impression.—*J. G. Harper, in Dental Digest.*

**Gold as a Filling Material.**—In my judgment gold is either the best or poorest filling material ; the best, when properly applied, and the poorest when the operation is imperfect. Deep pits or heavy undercuts are nearly always fatal to the permanency of a gold filling, and, so believing, I do not make either, because as I have just said, I regard gold as the best material when properly used or applied.—*W. J. Prather, Stom. Gazette.*

**An Antiseptic Mouth Wash.**—The *Gazette Hebdomadaire de médecine et de chirurgie* gives the following formula :

R	Carbolic acid	- - - - -	3 grains ;
	" Benzoic acid	- - - - -	90 "
	Tincture of eucalyptus	- - - - -	5 drachms ;
	Water	- - - - -	3½ pints.

M.

**Treatment of Periostitis.**—In periostitis the following formula has acted charmingly as a sedative :

R	Tinet. verat viride	- - - - -	5 drops.
	Potassi bromidi	- - - - -	20 grains.
	Aqua dest., ad. q. s.	- - - - -	2 drachms.

M. Sig.: One dose in water to be repeated every four hours.—*Dental News.*

**Cotton-Cocain Pellets.**—I have here something which I think is of great importance. Parke, Davis & Co. are making for me pellets of cotton in which they incorporate a fixed amount of cocaine—one-fifth and one-tenth of a grain—in different sizes. This assures you of a fixed dosage and a fresh solution. Simply place a pellet in the cavity and moisten it with water, and proceed in the usual manner.—*F. T. Van Woert, in Cosmos.*

**How to Seal Root-Canals.**—One of the very best methods of sealing a root-canal is to take a little [pledget of cotton and saturate it with oxychlorid of zinc and put it up to the end of the canal, especially if the opening be a natural opening, one which you have not drilled ; and you need not have the slightest fear, after having filled a tooth-root in that way, of anything coming down through the apex from the outside of the tooth to make trouble.—*D. D. Smith, in Items.*

**How to Make a Combination Deep and Shallow Counter Die.**—Mr. Lennox showed how he makes his counter dies so as to secure in one counter the advantages of deep and shallow counters combined. He wrapped a roll of modeling clay along the line of the edge of the desired plate and dipped the die far enough into the molten lead to fully

cover the clay, and then showed how readily a plate somewhat larger than was actually required could be passed into the counter.—*Dr. Lennox, in Jour. Brit. Asso.*

**Extracting Roots.**—Did you ever break off a lateral incisor or bicuspid, notably the first bicuspid, or any other tooth so far under the alveolar process, that it seemed impossible to again grasp it with the forceps? It is my practice in such cases to inject cocaine, and with a sharp bur cut away the process on either side of the root as far as desired, when the root can be grasped without any trouble whatever, and easily removed. Under the local anesthetic this operation is a painless one.—*D. D. A., in Dental Weekly.*

**Commercial Form of Formaldehyde.**—It appears in commerce principally in the form of a solution of the gas in water, which is also called formalin (trade-mark) and formol. These solutions are almost always sold as containing 40 per cent. of the gas. They are colorless liquids, having an acid reaction, and the pungent odor of formaldehyde. It is now generally admitted that they are not simple solutions of the gas in water, but a mixture of the various polymers of it, and all of which on proper treatment yield the gas.—*Amer. Druggist.*

**Chemical Properties of Formaldehyde.**—Formaldehyde has powerful chemical affinities, combining with many bodies; sometimes definite and crystalline substances are formed, but often amorphous ones of doubtful composition. Many additional products are formed by it. The fact that formaldehyde and ammonia combine quite readily is interesting and of great importance, as it affords a means for its determination, and, as the product of the combination, is odorless, the pungent odor of formaldehyde can be readily removed by the vapor of ammonia.—*Amer. Druggist.*

**Imitation Granular Gum.**—When using plain teeth and pink rubber, instead of finishing gum with file and sandpaper, use with the dental engine a large round bur (rather dull); a smaller bur in the corners between the teeth. With the rapidly revolving bur carve the gum festoons, moving first vertically and then longitudinally; as the carving process nears completion pass the bur lightly over the surface, then polish with brush wheels, pumice and whiting. This gives that granular appearance peculiar to the natural gum, and not a perfectly smooth surface.—*E. A. Randall, Dom. Dental Journal.*

**Tumors Resulting from Septic Pulps.**—Experience leads me to believe that the origin of fully ninety per cent. of all tumors of the jaw, face and neck can be traced to diseases of the teeth, and in many

cases to the septic pulp. The most common of these tumors is the alveolar abscess, the contents varying from mere gas to thick pus. The treatment has been described so often that I shall not here repeat it, further than to say—remove the cause, and prevent recurrence. This can be done by cleansing the pulp canal, filling it perfectly, dissecting away the sac, roughening the surface of the bone sufficient, and promoting healthy granulation to fill the cavity.—*G. Lennox Curtis, Dom. Journal.*

**To Control Hemorrhage after Extracting.**—Mix dental plaster quite stiff and with a tightly rolled ball of absorbent cotton press the plaster, one *piece* after another, into the alveoli until the bleeding stops. If worked skilfully it acts like magic, and a fair trial will convince the most skeptical. I have employed this method for the last ten years, in which time I have had a number of very severe cases, but have controlled the worst I have seen in from five to ten minutes' time. The plaster requires no further attention, which is a great advantage over a plug of cotton or other material. As the wound heals the plaster is thrown off without having caused the least irritation.—*M. K. Langille, Dom. Journal.*

**Don't use Plain Teeth** in constructing artificial dentures where the rubber, either pink, red or black, will show. If you have difficulty in making perfect joints with gum sections, then follow these directions, viz.: Grind the joints upon a large, true-running corundum wheel, making the fitting close front and back. Before investing, cover the front surface with cement and allow one hour to harden. Let the case, after investing, remain over night before packing, so that the plaster will become thoroughly set, and then proceed to pack without a surplus of rubber. If it is not possible to let the case remain over night before packing, then grind the inner half of the joints to a V-shape, and fill with oxychlorid of zinc, allowing one hour for hardening before packing.

—*Western Dental Journal.*

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## EDITOR'S NOTES.

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### Our Aim.

WHAT is best? This is a question that is constantly confronting the editor. Were only his tastes to be considered it would be an easier problem to solve, but when he is to decide for thousands of readers, it becomes a great question as to what should be pub-

lished and what should not. We have sought to present, in as concise a form as possible, the most valuable thoughts presented to the dental profession by its members throughout the world. How well we have succeeded our readers alone should judge.

• We have received many kind words of approval for the general selections presented in the OHIO DENTAL JOURNAL, and one subscriber writes that "it is the best dental journal published in America." We appreciate these words of praise, yet we do not think that our magazine is perfect; few things ever become perfect. Our aim, however, is to make it as near the ideal dental journal as possible and to do this we feel the need of suggestions from those whom we are serving. If our subscribers will kindly tell how we can further improve THE OHIO DENTAL JOURNAL these suggestions will be most welcome. We want to do what is best; present just the material that our readers want, for they are the ones for whom we are working. We desire also to extend our thanks to subscribers for their continued patronage and the many kind words they have expressed, and we wish one and all a merry Christmas and happy and prosperous New Year.

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### The Closing Volume.

It seems but fitting that, in closing Volume XVII., we should say a few words regarding it and particularly call the attention of our readers to the valuable material that it has contained. Original articles from many of the best men in the dental profession have appeared in its pages, this volume alone containing one hundred and fifteen original contributions. In all there have appeared in the pages of THE OHIO JOURNAL, during the year, a grand total of 648 articles, exclusive of Aftermath, Society and Book Notices, many of which alone are worth more than the subscription price of the JOURNAL for an entire year. If you have not read each number thoroughly we advise you to do so; at least look the JOURNALS over and you will be convinced of the many valuable articles the volume contains. Help us make the coming volume even better than the past, by renewing your subscription and sending us from time to time some useful hint or method that you have found of service in your own practice.

### New Publications.

**TIN FOIL AND ITS COMBINATIONS FOR FILLING TEETH.** By Henry L. Ambler, M.S., D.D.S., M.D., Professor of Operative Dentistry and Dental Hygiene, in the Dental Department of Western Reserve University. Philadelphia: The S. S. White Dental Mfg. Co., Publishers, 1897. Price, \$1.00.

This book of one hundred pages is the latest addition to dental literature, and is the only complete treatise on tin to be found anywhere.

The author believing that sufficient prominence has not been given to the filling of teeth with tinfoil, and after an experience of over thirty years in its use, presents the profession not only with his own ideas and practical methods of use, but with the methods and opinions of some of our most eminent practitioners. Prof. Ambler has a method of preparing and manipulating the foil which differs very materially from the commonly accepted form; still it is simple, easily comprehended, and is described in such clear and concise terms that no one can fail to understand it. The facts and principles upon which the art is based, are explained at length, so that both student and teacher can find just what they want without searching through an immense amount of literature.

The first chapter is devoted to the antiquity of tin, medical use, purity, physical characteristics; under the latter heading will be found some new facts.

Chapters two and three are devoted to a chronological history from 1783 to date, and is made very interesting as the largest dental library in the world was thoroughly searched for data.

The process of manufacturing tin foil, which we believe has not before been published, is here described.

Chapter four says tin is cohesive and useful in chalky teeth, etc.

In Chapter five is given a definite solution of the discoloration of tin fillings. It also deals with galvanic action in a clear manner, and gives valuable information not generally known. Other chapters tell how to prepare foil and fill cavities; electrolysis; white caries; tin and gold combined in *several* different ways; lining cavities with gold; filling with ivory points (pluggers.)

On page 94 is an article on thermal effect, which is quite unique.

The author and publishers are to be thanked for placing in the hands of the profession a volume, for one dollar, that is up to date and has so much of practical value in it for the everyday practitioner. It is the only book of the kind and it is fair to presume that the colleges will adopt it as a text-book.

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THE PRINCIPLES OF BACTERIOLOGY: A PRACTICAL MANUAL FOR STUDENTS AND PHYSICIANS. By A. C. Abbott, M.D., Prof. of Hygiene and Director of the Laboratory of Hygiene, University of Pennsylvania. Fourth edition; enlarged and thoroughly revised. Philadelphia and New York: Lea Brothers & Co., Pub., 1897.

Abbott's Bacteriology is the standard text-book for medical students, and the frequent editions keep it abreast of the times.

The more important of the newer ideas bearing directly upon the subjects under treatment have been added to this edition, and in addition to the topics treated in the last one there have been introduced illustrated descriptions of the bacillus of bubonic plague, of the bacillus of influenza, and of the micrococcus of gonorrhea, as well as a number of new illustrations relating to descriptive passages in the text. The book is concisely written and well arranged. It deserves the popularity it has attained.

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RHYMES OF THE STATES. By Garrett Newkirk. New York: The Century Co., Pub. Price, \$1.00.

The title of this book does not convey a correct idea of its contents, for it comprises much more than simple rhymes. The author realizing that it is no easy task, especially for children, to fix in mind the location, outlines, physical features, and historical record of all the States, has tried to reduce all these distinctive facts into the form of simple rhymes, easily impressed upon the memory, and accompanied by pictures which illustrate the idea contained in the verses. In the pictures each State has been shown on a single page, and in addition to an outline map of the State, there is given a caricature sketch of some object or animal

which the State might be said to resemble in form. These, the author believes, will prove very useful in fixing in the child's mind the shapes and main physical features of the different States. The idea is very original and the book can but prove beneficial to all who read it. Dr. Newkirk being one of our prominent dentists makes the work of special interest to members of the dental profession. You cannot buy for Christmas a more valuable book for the boys and girls than "Rhymes of the States."

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THE HUMAN TEETH AND THEIR PRESERVATION. By E. Ballard Lodge, D.D.S., Cleveland, Ohio.

This little pamphlet of twenty-seven pages contains instructions to patients on the care and preservation of the teeth. It is well written, neatly printed and bound in paper. Every dentist should have a supply of these little booklets.

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PROCEEDINGS OF THE NATIONAL ASSOCIATION OF DENTAL FACULTIES, 1897. St. Louis: Pub. by the Association.

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ANNOUNCEMENT.—The second volume of "Irregularities and their Correction," by J. N. Farrar, M.D., D.D.S., is now being bound and will be ready for delivery in December. This volume contains over eight hundred pages of text. A review notice will appear later.

### Obituary.

DR. D. R. JENNINGS.

DR. D. R. JENNINGS of Cleveland, O., who has been in ill health for several years, died at the Huron St. Hospital on Friday, Oct. 29th, 1897, aged 57 years. He was a superior operator, and gave his whole time and attention to the practice of his profession. He was a member of the Ohio State Dental Society, having been its president in 1877, and a member of the American Medical Association. He was well known throughout the pro-

fession and many will be sorry to learn of his sudden demise.

Dr. Jennings was born at Ravenna, Portage county, O., on January 27, 1840, a son of David Jennings, Jr., and Anna (Rawson) Jennings. He first attended the public schools at Ravenna and then went to Twinsburg Academy and then to Knox College, Galesburg, Ill., leaving there in the winter of 1855-56. About this time young Jennings was thrown entirely on his own resources, and to procure any further education it was necessary for him to earn the money to pay the necessary expenses of doing so. He accordingly secured a position at the Ohio Penitentiary working as night guard, and with the salary thus derived took one course of study at Starling Medical College, after which he studied dentistry with Dr. Joshua D. Willis, dentist at Ravenna, a cousin of N. P. Willis, the poet. In 1862 he opened a dental office at Ravenna and there remained in the practice of his profession until 1872, in the meanwhile, in 1867, having the honorary degree of D.D.S. conferred upon him by the Ohio College of Dental Surgery, at Cincinnati.

In 1872 he went to Cleveland, where he has since been engaged in the practice of his profession. In 1887 the honorary degree of M.D. was conferred on him by the medical department of Wooster University. On September 27, 1861 he was married to Miss Elizabeth Monroe; they have two children, William M., born in 1866, and Andred Rawson, born in 1870.

Dr. Jennings was a member of the Masonic order, belonging to Tyrian Lodge, of Cleveland. He had also taken the chapter, council, commandery, and consistory degrees up to and including the 32d. He was one of the first Masons in the State that received the degree in the Mystic Shrine.

We extend our sympathy to the bereaved family.

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#### DR. COURTLAND KING.

DR. COURTLAND KING died at his residence in Uniontown, Pa., Nov. 4th, 1897, aged 71 years.

Dr. King was born in Elizabeth township, Allegheny county, Pa., Dec. 25, 1826. At 14 his parents moved to a farm near Monongahela where he grew to manhood. In 1850 from the farm he entered Washington college, and in four years completed a

course usually requiring six years, graduating in the class of 1854. In after years he graduated in dentistry in the University of Pennsylvania at Philadelphia, and also took a diploma for a completed course in the anatomical department of the same university. In about 1859, after the study of practical dentistry with his brother in Pittsburg, he began to practice in Uniontown, where he remained until after the close of the war. He then removed to Pittsburg where he continued his practice until the spring of 1882, when he retired from his profession and returned to Uniontown. Here, except during part of three years spent in Toledo, Ohio, he lived in his comfortable home until his death.

Professionally, he ranked well and prided himself in an ambition to do good work. Four brothers of this family became dentists. In character, he was honest, trust-worthy, true to every relation he sustained, straightforward, far removed from self-seeking, and had great goodness of heart. He was the inventor of King's Occidental Amalgam, that for many years was so popular. A wife, a sister and three brothers, Drs. Calvin, Milton, and James Stewart King, all of Pittsburg, survive him.

## SOCIETIES.

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### **Ohio State Dental Society.**

THIS promises to be *the best meeting yet held.* Instructive papers; all-day clinic, etc., at Columbus, Dec. 7-8-9-1897. Be sure to go.

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### **Resolutions of Northern Illinois Dental Society.**

To the President and Members of the National Dental Association, and to the President and Members of the National Association of Dental Examiners.

*Gentlemen:*—At the tenth meeting of the Northern Illinois Dental Society held at Rockford, Ill., October 20, and 21, 1897, the undersigned were appointed a committee to draft and present to your Association suitable resolutions, with a view to remedy

an existing evil regarding the interstate practice of dentistry, and we herewith submit the following for your consideration:

WHEREAS, A legal practitioner of any one of the United States, who desires to remove to another state, is, under the existing laws, compelled to comply with certain requirements of the dental law of that state; and

WHEREAS, In many instances such legal practitioner, (sometimes of many years experience) is subjected to a more or less severe theoretical examination, which can not even be successfully passed by many who are fresh from the college halls; therefore be it

*Resolved*, That the National Association of Dental Examiners and the National Dental Association, be and are hereby requested to enact such rules, or to secure such modification of the dental laws of the various states, which, under reasonable restrictions, will enable competent practitioners to remove from one state to another without being compelled to submit to provisions, which are eminently unfair to a large number of capable dentists.

Dated November 10, 1897.

LOUIS OTTOFY,  
W. H. TAGGART,  
M. L. HANAFORD. } Committee.

Attest: JAMES H. CORMANY, Secretary.

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#### Officers of Northern Illinois Dental Society.

PRESIDENT, C. B. Helm, Rockford; Vice-President, Louis Ottfoy, Chicago; Secretary, James Cormany, Mt. Carroll; Treasurer, M. R. Harned, Rockford; Member Executive Committee, E. J. Perry, Chicago.

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#### Important Notice.

HAVE you read this issue carefully? Compare it with other dental publications, and you will better appreciate how much you are getting for the small amount of money expended. Subscribe immediately for 1898.

**NOTICE.**--The February issue will be an "ELECTRICAL NUMBER," filled with valuable contributions, on the use of electricity in dentistry, by prominent dentists who have been giving this subject special attention.

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**EDITED BY**

**L. P. BETHEL, M. D., D. D. S.,**  
**KENT, OHIO.**

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